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Anacroneuria mainly from southern Brazil and northeastern Argentina (Plecoptera: Perlidae)

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Abstract.—Thirteen previously described species of *Anacroneuria* Klapálek are considered: *A. badilinea* Jewett, *A. debilis* (Pictet), *A. dilaticollis* (Burmeister), *A. fuscicosta* (Enderlein), *A. impensa* Jewett, *A. minuta* Klapálek, *A. novateutonia* Jewett, *A. oculatila* Jewett, *A. plaumanni* Jewett, *A. polita* (Burmeister), *A. subcostalis* Klapálek, *A. tinctilamella* Jewett and *A. trimacula* Jewett. *A. ampla* Jewett is considered a synonym of *A. plaumanni.* Twelve new species are described: *A. cathia, A. coscaroni, A. flintorum, A. stanjewetti, A. petersi, A. rondoniae, A. saltensis, A. caraja, A. toriba, A. uyara, A. xinguensis,* and *A. ytuguazu.*

Anacroneuria is the dominant stonefly genus in the Neotropics and, in many areas, the only one. This is a difficult genus, not only for the numerous species, but also because of the insufficient descriptions by older authors compounded by the loss of many types. The first thorough treatment of the genus and of a number of species was made by Zwick (1972, 1973); he stresses the importance of studying the genitalia, in particular the male genitalia, for species discrimination. Comments on the difficulties in the study of the genus, like handling older material, synonyms, etc. appears in the articles of Stark, especially in Stark (1998). He also comments on the strong pattern of endemism, confirmed herein, as almost no species from mid-southern South America is found to the north.

The intention of this study is to consider, primarily, the material deposited in the National Museum of Natural History of the Smithsonian Institution (NMNH). It is not intended to completely revise nor figure all the Brazilian species of the genus, especially those adequately figured by Zwick (1972, 1973) or Jewett (1959, 1960). Other studies completely revising and newly illustrating the entire fauna of southeastern South America are in preparation.

The Brazilian material studied is primarily specimens collected by Fritz Plaumann in Nova Teutonia, Santa Catarina State, including paratypes of species studied by Jewett (1959), as well as material from other scattered localities in Brazil as available. Most of the material from northeastern Argentina (Provinces of Entre Rios and Misiones) was collected by O. S. Flint, Jr., in his 1973 expedition. Some material from southern Paraguay is also included. The California Academy of Sciences (CAS) contains additional material collected by Plaumann, including several types which were examined. The Senckenberg Museum of Frankfurt, Germany, (SMF) sent an important lot of specimens collected in Corupá (then called Hansa-Humboldt), Santa Catarina State, by Ehrhardt in 1928–1929. More specimens from the same and other localities were sent by P. Zwick, (Zwick) Schlitz, Germany.

Anacroneuria badilinea Jewett

Fig. 1

Anacroneuria badilinea Jewett, 1959: 157, fig. 14 [head and pronotum].

Material examined.—Holotype, ♀ Brazil, Santa Catarina, Nova Teutonia, Oct 1956, F. Plaumann (CAS). Additional specimens: Same data as holotype, but Nov 1955, 2 ♀♀ paratypes (NMNH). Argentina, Misiones, Arroyo Piray-Mini, W of Dos Hermanas, 1 ♀, 23 Nov 1973, O. S. Flint, Jr. (NMNH).

Adult habitus.—Head brown and yellowish, darkest between ocelli, in front of tentorial scars, anterior to M-line and in posterior half of lappets. Pronotum with irregular brown sublateral stripes; on each side of ecdysial line a fine light border irregularly margined by brown. Legs light brown and yellowish. Wing membrane and veins brownish ochraceous, C, Sc, R-R_1 paler, but bordering membrane of these veins darker. Basal cercomeres pale, following ones bicolored.

Male.—Unknown.

Female.—Forewing length of holotype, 20 mm; of other females, 16.5–18.7 mm. Subgenital plate (Fig. 1) with pair of medial lobes separated by a rather deep notch; lateral notches shallower, lateral lobes forming corners of plate. Vaginal sclerite as shown. St9 with a well-defined "T", lateral setae stronger. Distal margin concave with a thin transverse sclerite and a dense row of hairs.

Remarks.—As stated by Jewett (1959), the color pattern of the head and pronotum is distinctive. So is the shape of the subgenital plate, with two relatively large and narrow lobes separated by a deep median notch, and lateral lobes forming corners of the plate.

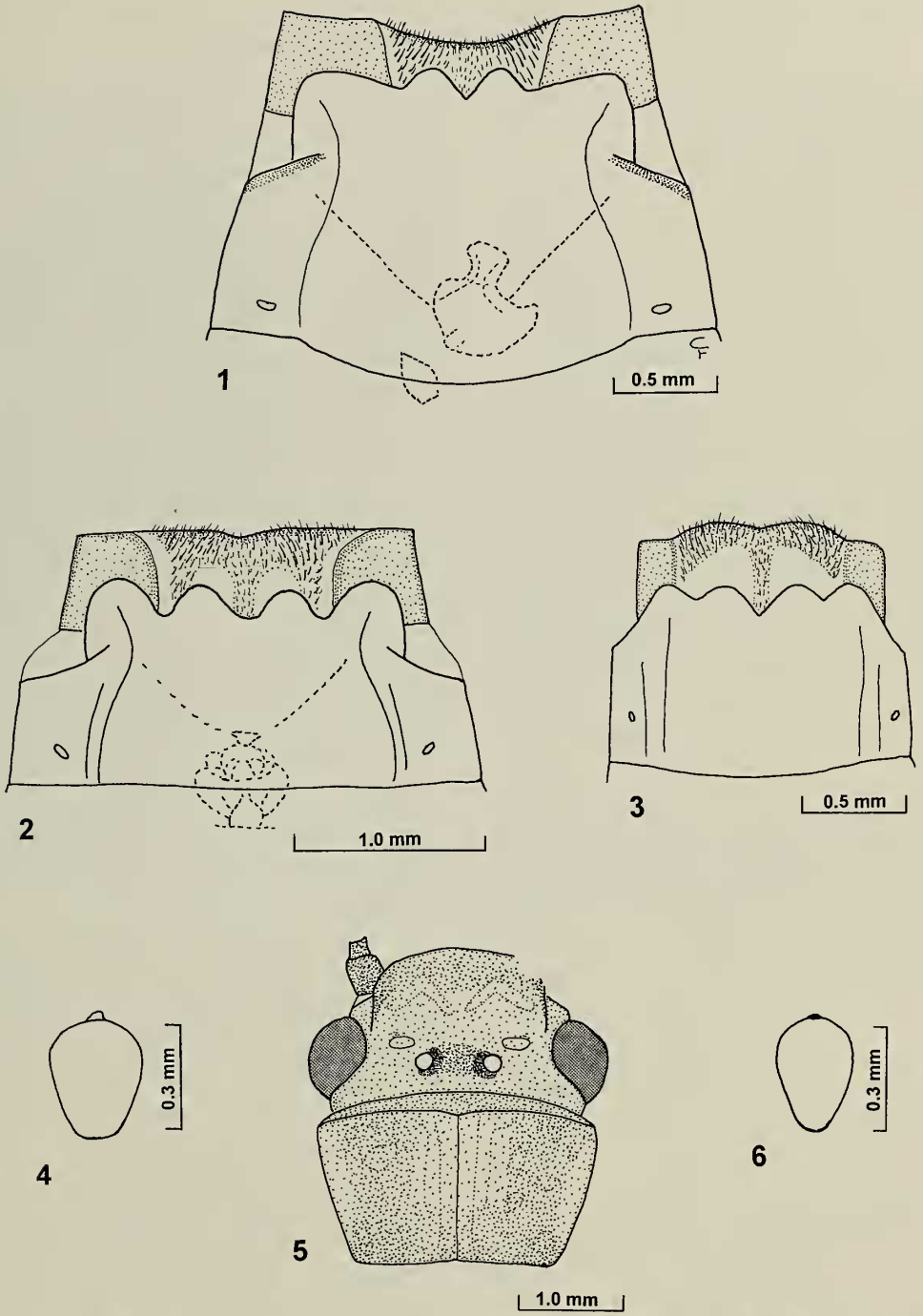
Anacroneuria debilis (Pictet)
Figs. 2–4

Perla (*Perla*) *debilis* Pictet, 1841: 255, pl. 26, fig. 4 [habitus].

Anacroneuria debilis.—Zwick, 1972: 1155, fig. 5b [penial armature]; 1973: 486, figs. 17–18 [partim, female terminalia, sternum 9].

Material examined.—Brazil, Santa Catarina, Nova Teutonia, F. Plaumann leg., 1 ♂, 7 Oct 1955; 5 ♂♂, 27 ♀♀, Jan 1975 (NMNH); 1 ♂, 3 ♀♀, Jan 1956; 1 ♀, Oct 1956; 1 ♂, 1 ♀, Feb 1957; 5 ♂♂, 3 ♀♀, Oct 1960; 3 ♂♂, Oct 1961; 1 ♀, Jan 1962; 1 ♂, 5 ♀♀, Oct 1962; 1♀, Nov 1962; 2 ♀♀, Dec 1962 (CAS); 1 ♂, 3 ♀♀, Nov 1956 (Zwick). Corupá, W. Ehrhardt leg., 1 ♂, 25 Apr 1928 (SMF); 1 ♂, 5 Nov 1928 (SMF); 2 ♂♂, 16 Jan 1929 (SMF, Zwick); 2 ♂♂, 7 Apr 1929 (SMF). Baracão [sic], 700 m, 1 ♂, 1♀, Oct 1962, F. Plaumann (CAS). Urubici, 1500 m, 1 ♂, Oct 1962, F. Plaumann (CAS). Paraná, Iguaçu, Cataratas, 1♀, 8 Mar 1968, W. L. & J. G. Peters (NMNH). Espirito Santo, Ribeirão do Engano, Vale do Itaunas, 1 ♂, 2 ♀♀, 9 Dec 1942, Travassos & Santos (CAS); Santa Teresa, Reserva do Museu, 1 ♂, 2 ♀♀, 13 Nov 1955, Santos, Machado & Barros (CAS); 15 km SE of Santa Teresa, Fazenda Santa Clara, 3 ♀♀, 22 Apr 1977, O. S. & C. Flint (NMNH). Argentina, Entre Rios, Salto Grande, Rio Uruguay, 1 ♂, 16 Nov 1973, O. S. Flint, Jr.(NMNH). Misiones, Arroyo Coati, 15 km E of San José, 1 ♂, 23 ♀♀, 18–19 Nov 1973, O. S. Flint, Jr.(NMNH); Arroyo Liso, 8 km W of General Guemes, 5 ♀♀, 19 Nov 1973, O. S. Flint, Jr.(NMNH); Arroyo Saura, 9 km N of L.N. Alem, 1 ♀, 20 Nov 1973, O. S. Flint, Jr.(NMNH); Arroyo Piray-Mini, W of Dos Hermanas, 1 ♂, 11 ♀♀, 23 Nov 1973, O. S. Flint, Jr.(NMNH). Paraguay, Parque Nacional Ybycui, 1 ♂, 23 Jan 1981, R. D. Cave (NMNH).

Remarks.—This species has been redescribed and had the genitalia figured by Zwick (1972,1973). Here two figures of the female genitalia are given (Figs. 2–3), showing variation in the subgenital plate lobes. It seems to be common and widespread, extending from the State of Espirito Santo in southeastern Brazil to the provinces of Misiones and Entre Rios in Argentina and to southern Paraguay. The eggs (Fig. 4) are plumper than the one figured by Zwick (1973, fig. 17), this probably belongs to *A. cathia.*



Figs. 1–6. *Anacroneuria badilinea* Jewett: 1, female, sterna 8 and 9, ventral view. *A. debilis* (Pictet): 2–3, female, sterna 8 and 9 of 2 specimens; 4, egg. *A. dilaticollis* (Burmeister): 5, head and pronotum of type; 6, egg.

Anacroneuria dilaticollis (Burmeister)
Figs. 5–6

Perla dilaticollis Burmeister, 1839: 880.
Anacroneuria dilaticollis.—Zwick, 1972: 1156, fig 6e [female terminalia].

Material examined.—Holotype: ♀, Brazil, Museum Halle. Additional material: Brazil, Espirito Santo, 15 km E of Santa Teresa, Fazenda Santa Clara, 2 ♀♀, 22 Apr 1977, C. M. & O. S. Flint (NMNH).

Remarks.—The type of this species has been redescribed and had the genitalia figured by Zwick (1972, fig. 6e). This type is the only sure bearer of the name, despite a number of subsequent identifications, beginning with Pictet (1841). The two females listed here agree well in color pattern and details of the female terminalia as described by Zwick (1972). The head and pronotum of the holotype is shown in Fig. 5. The egg of the present material is shown in Fig. 6.

Anacroneuria fuscicosta (Enderlein)
Figs. 7–11

Neoperla costalis var. *fuscicosta* Enderlein, 1909: 178, fig. 12.
Anacroneuria fuscicosta (Enderlein).—Jewett, 1959: 155, figs 8, 8A (partim, head and pronotum, 2 specimens).—Zwick, 1973: 486, figs. 19, 20 (egg, sternum 9 and vaginal sclerite).

Material examined.—Brazil, Santa Catarina, Nova Teutonia, F. Plaumann leg., 1 ♀, 7 Oct 1955; 1 ♀, 8 Nov 1955; 2 ♀♀, Nov 1955; 5 ♀♀, Jan 1956; 4 ♀♀, Oct 1956; 2 ♀♀, Feb 1957; 2 ♀♀, Oct 1960; 4 ♀♀, Jan 1962; 4 ♀♀, Nov 1962; 2 ♀♀, Dec 1962; 2 ♀♀, Jan 1963 (CAS); 1 ♂, 3 ♀♀, Nov 1956 (Zwick); 2 ♀♀, Jan 1975 (NMNH); Baracão [sic], 1 ♀, Oct 1962, F. Plaumann (CAS). Paraná, Rio dos Patos, 3 km E of Prudentópolis, 700 m, 1 ♂, 2 Mar 1969, W. L. & J. G. Peters (NMNH). Argentina, Misiones, Arroyo Coati, 15 km E of San José, 2 ♀♀, 18–19 Nov 1973, O. S. Flint, Jr. (NMNH); Arroyo Piray-Mini, W of Dos Hermanas, 2 ♀♀, 23 Nov 1973, O. S. Flint, Jr. (NMNH).

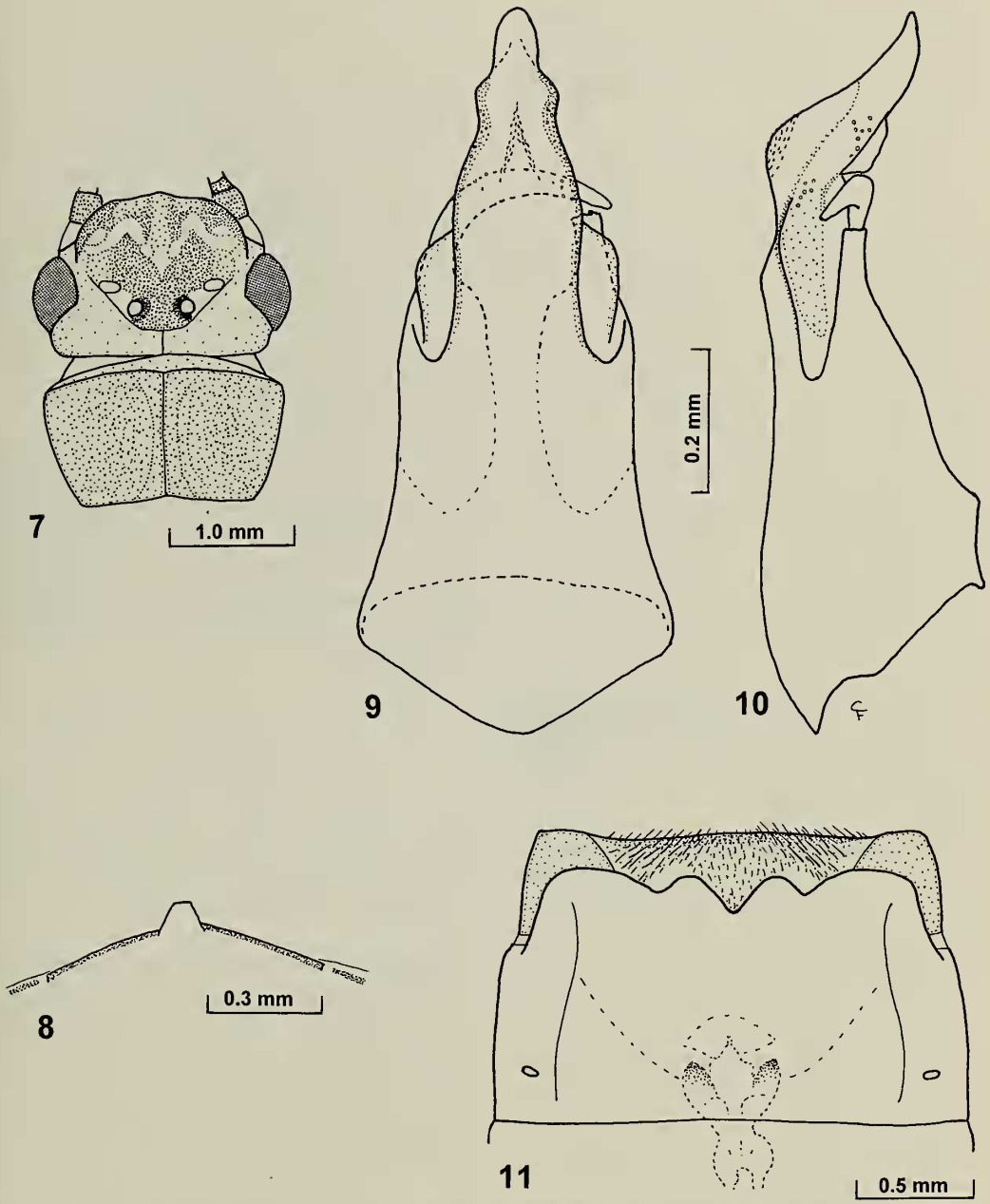
Adult habitus.—Frons brown to brownish ochraceus from the M-line backwards, except laterally to ocelli and bordering eyes (Fig. 7). A light median spot just back of the M-line may be present. M-line and scars ochraceous to light brown; laterally to M-line, a lighter area. Frons in front of M-line dark but may have a median light area. Clypeal area usually lighter, lappets at least posteriorly dark. Parietalia ochraceous, but brownish behind eyes. Pronotum (Fig. 7) brown to ochraceous-brown, with or without a lighter median stripe but this usually less defined than in *A. debilis*. Wing membrane and veins ochraceous to brownish, C not always darker. Femora bicolored, as described by Jewett (1959). Cerci brownish, basal segments often lighter, distal ones bicolored or not.

Male.—Forewing length, 9.3–10.1 mm. Hammer a truncate cone lower than wide (Fig. 8). Penial armature (Figs. 9–10), in dorsal/ventral views, with abrupt subapical narrowing, apical portion subparallel, tip rounded. In side view, apical portion gently curved dorsally, ending in a rounded point. Hooks regularly curved, tips blunt. Dorsal keel spinulose, in dorsal view a long V, vertex distal.

Female.—Forewing length, 10.9–14.0 mm (n = 31, $\bar{X}$ = 12.23 mm). Subgenital plate (Fig. 11) four-lobed, median notch deeper than lateral ones, median lobes narrower than lateral ones. Vaginal sclerite with dark processes. Posterior margin of St9 straight or slightly concave, lateral fields of bristles rather dense.

Egg.—Elongate oval with terminal peg on posterior pole.

Remarks.—Zwick (1973) designated a female lectotype from Enderlein's extensive, mixed-species, series of syntypes and commented that this series belonged to a difficult group whose members are very uniform in external appearance. He also commented that Jewett's (1959) material was also mixed. I examined from the CAS



Figs. 7–11. *Anacroneuria fuscicosta* (Enderlein): 7, female, head and pronotum; 8–10, male; 8, hammer; 9–10, penial armature, dorsal and lateral; 11, female, sterna 8 and 9.

a large lot of *Anacroneuria* collected by F. Plaumann at Nova Teutonia and identified by Jewett after his article. It contained, besides *A. fuscicosta,* a number of other species, confirming Zwick's statement on the difficulty in identifying this species. Of Jewett's figures, 8A may refer to *A. fuscicosta,* 8 looks more like *A. debilis.* This difficulty is made greater by an intraspecific variability in the color pattern. The species may be recognized, in the male, by the penial armature, in the female, by a straight

or slightly concave posterior margin of the St 9 and by the dark processes of the vaginal sclerite. The egg, with its terminal peg, is also characteristic.

Anacroneuria impensa Jewett
Figs. 12–17

Anacroneuria impensa Jewett, 1959: 157, fig. 12 [head and pronotum].

Material examined.—Holotype, ♀ Brazil, Santa Catarina, Nova Teutonia, 5 Nov 1955, F. Plaumann (CAS). Additional material: Same data as holotype but, 1 ♀, Oct 56 (Zwick, as paratype of *A. ampla*); 1 ♂, 6 ♀♀, Jan 1975 (NMNH). Santa Catarina, Corupá (formerly Hansa-Humboldt), 1♀, 13 Sep 1928; 3 ♀♀, 2 Nov 1928; 1 ♀, 4 Nov 1928; 1 ♀, 1 Dec 1928; 6 ♀♀, 10 Dec 1928; 1 ♀; 1 Jan 1929; 1 ♀, 1 Feb 1929; 2 ♀♀, 2 Feb 1929; 1 ♀, 11 Feb 1929; 1 ♀, 19 Feb 1929; 1 ♀, 14 Apr 1929; 1 ♀, 9 May 1929, Ehrhardt (SMF). Same data but 3 ♀♀, 13 Sep 1928 (Zwick). Argentina, Misiones, Arroyo Piray-Mini, W of Dos Hermanas, 3 ♂♂, 3 ♀♀, 23 Nov 1973, O. S. Flint, Jr. (NMNH).

Adult habitus.—The head pattern (Fig. 12) varies among specimens, but a constant feature is the yellowish parietalia, with this color extending to area lateral to the ocelli, including the tentorial scars. Along the middle of the frons, up to the postfrontal line, there is an irregular lighter stripe. The rest of the head is light to medium brown. The pronotum (Fig. 12) is yellowish to light brown, irregularly blotched. Wing membrane light brown, veins ochraceous-brownish, C, Sc, R-R_1 paler from base.

Male.—Forewing length 14.7–16.5 mm. Hammer (Fig. 13), short, wider than long, apex rounded. Penial armature (Figs. 14–15) tapering gradually towards apex but small more sclerotized shoulders near apex. Under shoulders, a pair of membranous vesicles. Dorsal keel low. In side view, a moderate depression near level of distal part of hooks.

Female.—Forewing length of type, 21.5 mm; other females from Nova Teutonia, 18.5–20.5 mm. Female from Misiones, 21.6 mm. Females from Corupá, 14.5–20.5 mm, with strong seasonal variation. Mean from December (n = 7), 17.0 mm; from February (n = 5), 15.1 mm. Subgenital plate (Fig. 16) four-lobed, median pair separated by deep notch, lateral pair by shallower ones. The median notch in the type is acute, but in other specimens may be rounded. Transverse sclerotization of St9 straight or more or less curved and with small hairs, hairs scattered on sternite, lateral setae strong.

Egg.—Oval (Fig. 17).

Remarks.—The color pattern of this species is distinctive and usually specimens can be separated from the other regional species of similar size, viz. *A. plaumanni, A. trimacula,* and *A. uyara,* especially by the head and pronotum patterns. Males can be readily separated by the shape of the penial armature.

Anacroneuria minuta Klapálek
Figs. 18–21

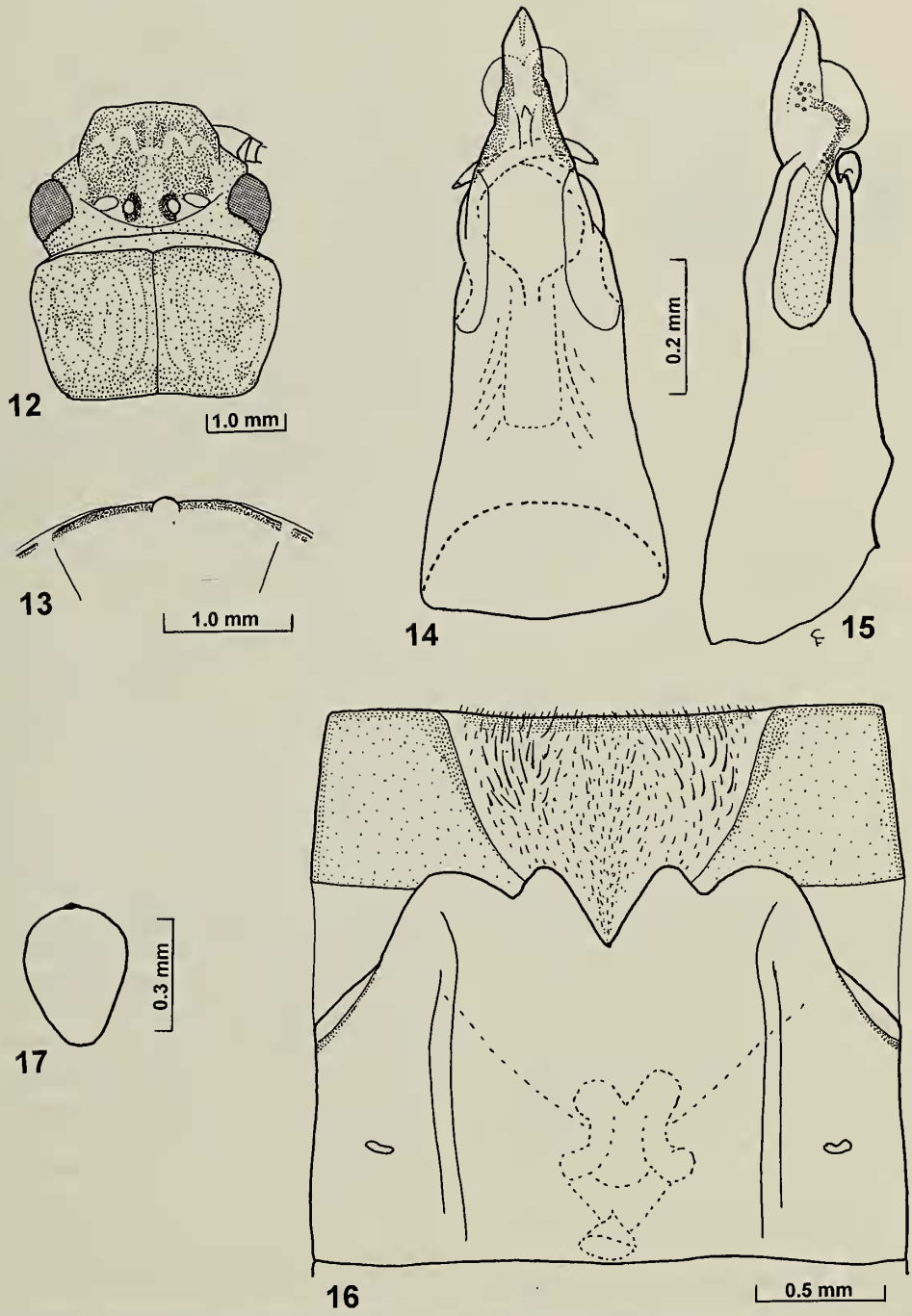
Anacroneuria minuta Klapálek, 1922: 89.—Ribeiro-Ferreira & Froehlich, 2001: 188, figs. 1–4 [head and pronotum, penial armature, female terminalia].

Material examined.—Brazil, Amazonas, Igarapé Tucunaré, 75 km W of Itacoatiara, 1 ♂, 30 Jan 1979, O. S. Flint, Jr. (NMNH).

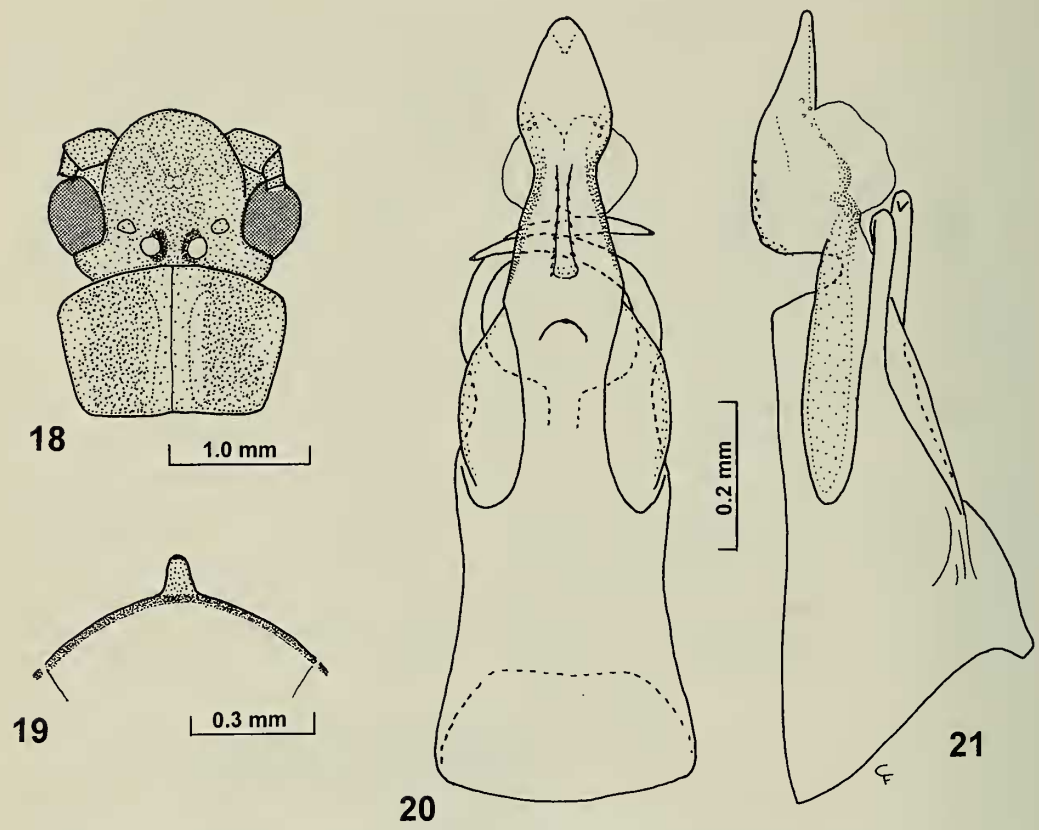
Adult habitus.—The general color light reddish-brown. Head rather uniform reddish-brown (Fig. 18). Pronotum reddish-brown with lighter median stripe and lateral areas. Legs ochraceous, femora darker at knee, tibiae expanded. Wing membrane almost clear, veins light to pale brown. Cerci pale brown.

Male.—Forewing length, 9.0 mm. Hammer (Fig. 19) an elongate truncate cone longer than basal diameter. Penial armature (Figs. 20–21) as described (Klapálek 1922).

Remarks.—Specimens described by Ribeiro-Ferreira & Froehlich (2001) were teneral. The color of the present specimen is



Figs. 12–17. *Anacroneuria impensa* Jewett: 12, female holotype, head and pronotum; 13–15, male; 13, hammer; 14–15, penial armature, dorsal and lateral; 16, female holotype, sterna 8 and 9; 17, egg.



Figs. 18–21. *Anacroneuria minuta* Klapálek, male: 18, head and pronotum; 19, hammer; 20–21, penial armature, dorsal and lateral.

similar to that of the type (Museum of Natural History, London).

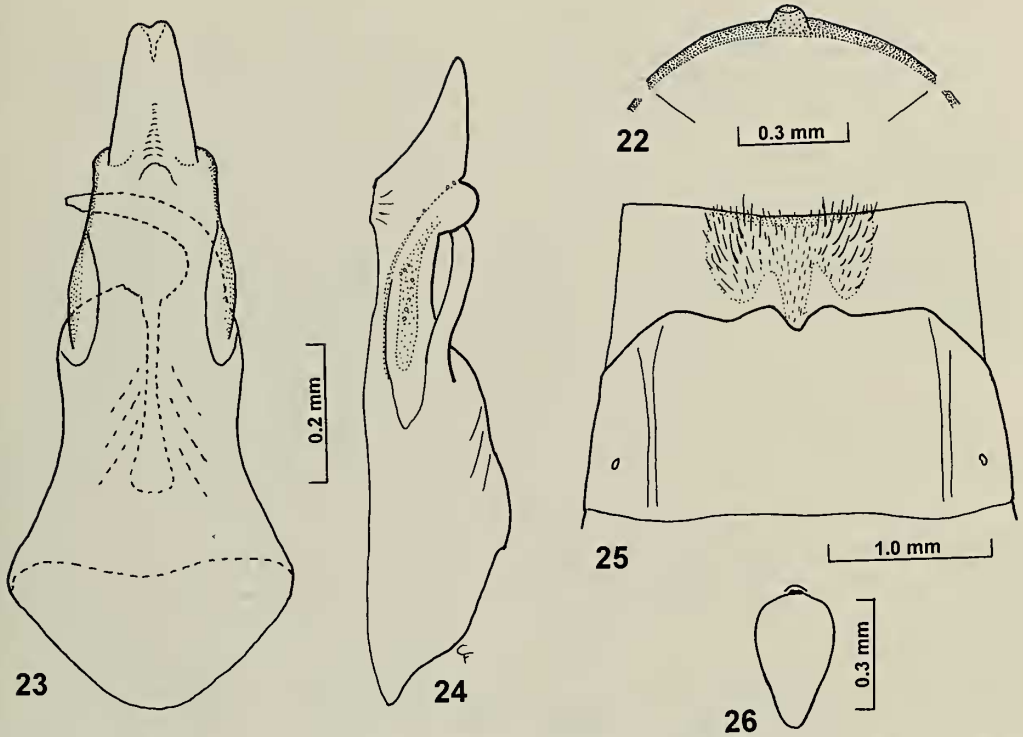
Anacroneuria novateutonia Jewett
Figs. 22–26

Anacroneuria novateutonia Jewett, 1959: 158, figs. 6, 6A [head and pronotum; sterna 8 and 9].

Material examined.—Paratypes: Brazil, Santa Catarina, Nova Teutonia, 7 ♀♀, 6 Nov 1955, F. Plaumann (Zwick); 1 ♂, 10 ♀♀, Jan 1956 (NMNH). Additional material: Ib., 1♂, 16 ♀♀, Nov 1962 (CAS, determined as *A. fuscicosta* by Jewett); 11 ♀♀, Jan 1975 (NMNH); Paraná, Iguaçu, 1 ♀, 8 Mar 1969, W. L. & J. G. Peters (NMNH). Argentina, Entre Rios, Salto Grande, Rio Uruguay, 1 ♂, 16 Nov 1973, O. S. Flint, Jr. (NMNH); Misiones, Arroyo Piray-Mini, W of Dos Hermanas, 1 ♂, 4 ♀♀, 23 Nov 1973, O. S. Flint, Jr. (NMNH).

Adult habitus.—General color light brown. Frons light brown but M-line, tentorial scars and antero-lateral corners lighter; clypeal area with median lighter spot. Antennae and apices of palpi brown. Pronotum light brown with thin lighter strip bordering ecdysial line; in some specimens, central disk and/or anterolateral corners lighter. Legs brown, except light bases of femora, progressively so from fore to hind femora; limits between brown and yellowish sharp. Wing membrane and veins brownish, C pale, Sc lighter distally, R pale basally.

Male.—Forewing length 9.4–11.1 mm. Hammer (Fig. 22) a truncate cone, basal width larger that height. Penial armature (Figs. 23–24) truncate apically in dorsal/



Figs. 22–26. *Anacroneuria novateutonia* Jewett: 22–24, male; 22, hammer; 23–24, penial armature, dorsal and lateral; 25, female, sterna 8 and 9; 26, egg.

ventral views, with subapical shoulders, hooks rather thick with sharp curve, apices blunt. Dorsal keel elongate, with striae.

Female.—Forewing length 11.6–13.7 mm, with temporal variation in size: mean for November (n = 10), 12.96mm; for January (n = 21), 12.38mm; t-test, $P < 0.001$. Subgenital plate (Fig. 25) four-lobed, median pair of lobes separated by a moderate-sized notch, lateral ones by shallow to very shallow notches. Posterior sclerotized bar of St9 slightly concave, lateral hairs strong and dense.

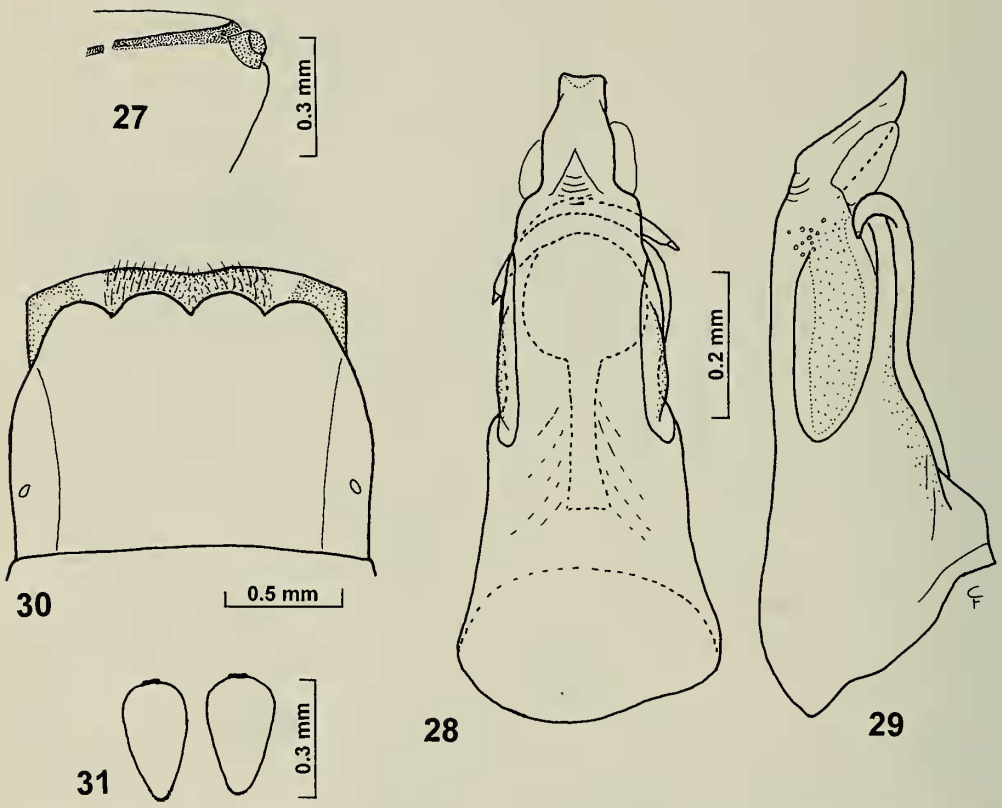
Egg.—About 0.22 by 0.39 mm, oval (Fig. 26), sometimes with posterior pole slightly constricted.

Remarks.—*A. novateutonia* is a medium-small species with a color pattern not very different from those of, e.g., *A. fuscicosta* or *A. debilis*. In the head, a distinguishing feature is that the area lateral to the ocelli and limited by the postfrontal line is dark, as is the rest of the posterior frons, instead of a lighter area as on the other species. In the pronotum a thin light stripe on each side of the ecdysial line is constant. The male from Misiones is much darker, almost uniformly dark brown. The morphology of the penial armature, with the relatively thick and strongly bent hooks that end in blunt tips and the shape of the apical portion, is diagnostic.

Anacroneuria oculatila Jewett
Figs. 27–31

Anacroneuria oculatila Jewett, 1959: 152, figs. 5, 5A [head and pronotum; sterna 8 and 9].

Material examined.—Paratype: Brazil, Santa Catarina, Nova Teutonia, 1 ♀, Jan 1956, F. Plaumann (NMNH). Additional material: Argentina, Misiones, Arroyo Coati, 15 km E of San José, 6 ♀♀, 18–19 Nov



Figs. 27–31. *Anacroneuria oculatila* Jewett: 27–29, male; 27, hammer; 28–29, penial armature, dorsal and lateral; 30, female, sterna 8 and 9; 31, 2 eggs.

1973, O. S. Flint, Jr. (NMNH); Arroyo Piray-Guazu, N of San Pedro, 1 ♂, 2 ♀♀, 22 Nov 1973, O. S. Flint, Jr. (NMNH).

Adult habitus.—General color brown to brownish-ochraceous. Posterior frons mostly ochraceous, contrasting with brown area anteriorly. M-line, clypeal area and part of anterior frons, as well as parietalia light in color; lappets brown. Antennae and palpi brown to light brown. Pronotum brown with paler brown to yellowish mid-stripe. Legs brown, except yellowish bases of femora, as in preceding species. Wing membrane and veins medium brown, C and R-R_1 lighter, Sc darker basally and paler distally. Wings with a lighter spot in distal half. Basal cercomere light, following ones brown but intermediate cercomeres may be bicolored.

Male.—Forewing length, 8.3 mm. Hammer (Fig. 27) a short truncate cone, wider than high. Penial armature (Figs. 28–29), in dorsal/ventral views, tapering to a truncate apex but with subapical shoulders. Dorsal keel low, V-shaped, vertex distal. Hooks evenly curved, relatively long, tips pointed.

Female.—Forewing length of female paratype, 11.4 mm, those of other females, 11.0–12.7 mm. Subgenital plate (Fig. 30) 4-lobed, lobes of similar size. Posterior sclerotized bar of St9 thin, with shallow median emargination; lateral hairs long, strong.

Egg.—Oval, ca 0.17 by 0.30 mm (Fig. 31), posterior pole narrow.

Remarks.—As stated by Jewett (1959), the head pattern, with its ochraceous area in front of the ocelli, and the light spots in

the wings distinguish this species. The penial armature is distinguished by by the low, V-shaped keel and long hooks.

Anacroneuria plaumanni Jewett
Figs. 32–38

Anacroneuria plaumanni Jewett, 1959: 154, fig. 13 [head and pronotum].
Anacroneuria ampla Jewett, 1959: 156, fig. 10 [head and pronotum]. New synonym.

Material examined.—*A. plaumanni* - Holotype, ♀ Brazil, Santa Catarina, Nova Teutonia, Nov 1955, F. Plaumann (CAS). Allotype ♂ same data as holotype but Oct 1956. *A. ampla*—Holotype, ♀ Nova Teutonia, Nov 1955, F. Plaumann (CAS). Paratype, ♀ Ib., Oct 1956, F. Plaumann (Zwick). Additional specimens: Ib., 1 ♀, Jan 1975 (NMNH). Argentina, Misiones, Arroyo Piray-Guazu, N of San Pedro, 2 ♀♀, 22 Nov 1973, O. S. Flint, Jr. (NMNH).

Adult habitus.—General color brown. Head (Fig. 32) mostly brown, M-line, tentorial scars and parietalia yellowish, M-line broken or entire. Antennae brown to dark brown, palpi lighter. Pronotum (Fig. 32) brown with light median stripe. Wing membrane hyaline, light brown, veins ochraceous to light brown, C and R_1 pale brown, Sc somewhat darker. Legs brown. Cerci brown from base.

Male.—Forewing length of *A. plaumanni* allotype, 13.8 mm. Hammer (Fig. 33) short, conical. Penial armature (Figs. 34–35), in dorsal view, with distal half tapering to a blunt apex; hooks regularly curved with pointed tips. In side view, dorsal keel low, apex rounded, a pair of ventral vesicles present.

Female.—Forewing length of *A. plaumanni* holotype, 17.1 mm; of *A. ampla* holotype, 19.4 mm, from other specimens, 17.5–19 mm. Subgenital plate of *A. plaumanni* holotype (Fig. 36) 4-lobed with a relatively deep median notch; that of *A. ampla* (Fig. 37) with much smaller lobes and a shallow median notch. St. 9 with distal margin sinuous to almost straight, slightly sclerotized. A 'T' present, with the usual patches of larger setae laterally.

Egg.—Elongate ovoid, about 0.20 by 0.42 mm (Fig. 38).

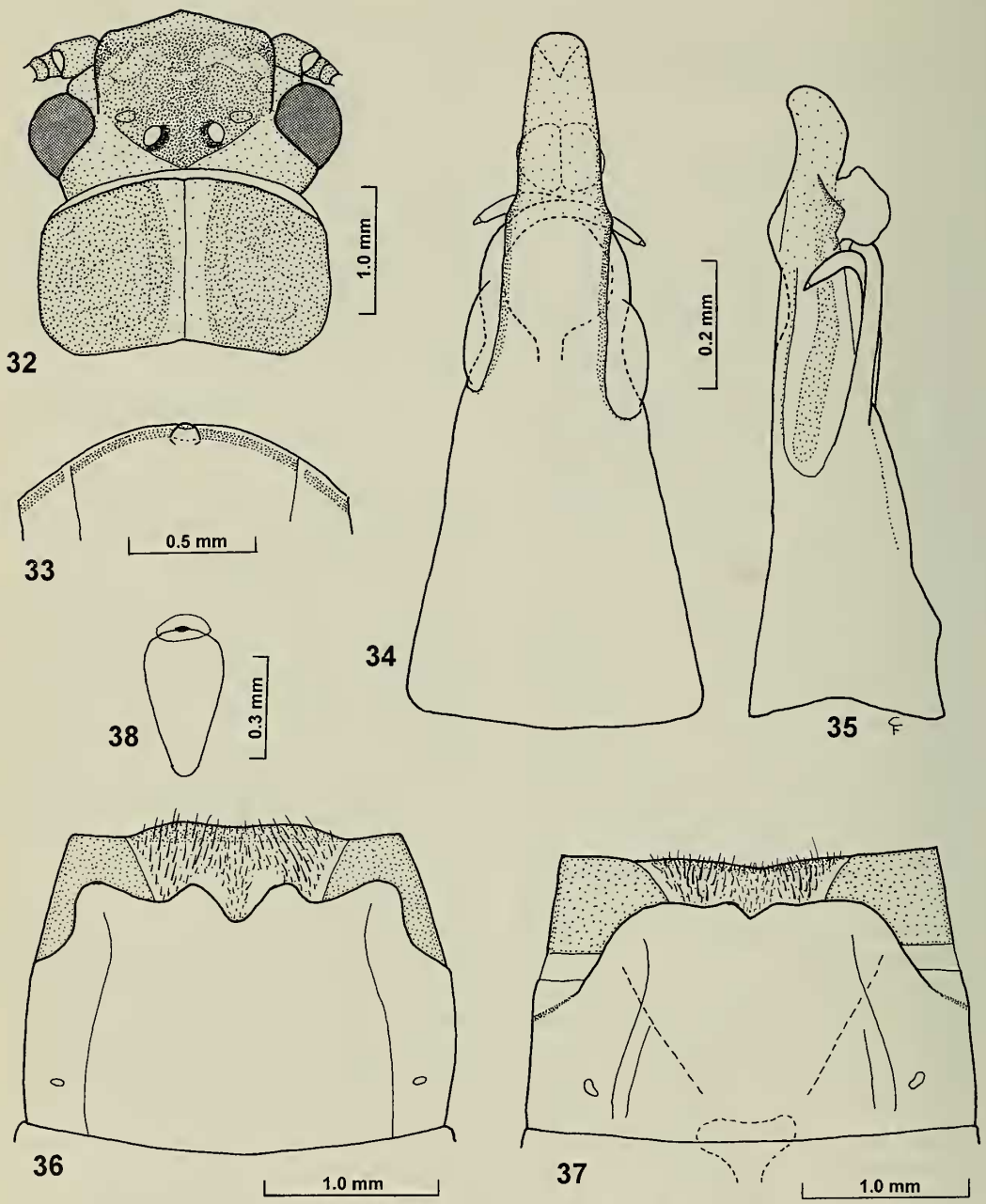
Remarks.—*A. plaumanni* and *A. ampla* agree in size, color pattern, details of St9, shape of eggs and are sympatric. There is a variation in the shape of the subgenital plate lobes, but other specimens of the material examined show more intermediate conditions, so I consider the second to be a synonym of *A. plaumanni.*

Anacroneuria polita (Burmeister)
Figs. 39–44

Perla polita Burmeister, 1839: 880.
Anacroneuria polita.—Zwick, 1972: 1163, fig. 5a [penial armature].

Material examined.—Holotype: ♂, Brazil, Museum Halle. Aditional material: Brazil, Paraná, Rio dos Patos, 3 km E of Prudentópolis, 1 ♂, 2 Mar 1969, W. L. & J. G. Peters (NMNH). Santa Catarina, Corupá (formerly Hansa-Humboldt), 1 ♀, 29 Mar; 1♀, 25 Apr; 1♂, 1 ♀, 12 Sep; 1 ♀, 13 Sep; 1 ♀, 20 Sep; 1 ♀, 4 Oct; 7 ♀♀, 19 Oct; 2 ♀♀, 31 Oct; 3 ♀♀, 2 Nov; 1 ♀, 4 Nov; 1 ♂, 5 Nov; 3 ♀♀, 10 Nov; 1 ♀, 17 Nov; 3 ♀♀, 18 Nov; 1 ♀, 3 Dec; 5 ♀♀, 7 Dec; 1 ♂, 1 ♀, 8 Dec; 9♀♀, 9 Dec; 1 ♀ 10 Dec; 3 ♀♀, 13 Dec; 1 ♀, 20 Dec 1928; 2 ♂♂, 5 ♀♀, 6 Jan; 1 ♂, 7 Jan; 2 ♂♂, 1 ♀, 12 Jan; 1 ♂, 3 ♀♀, 2 Feb; 3 ♀♀, 19 Feb; 2 ♀♀, 3 Mar; 2 ♀♀, 9 Mar; 2 ♂♂, 7 Apr; 1 ♀, 14 Aug 1929, Ehrhardt (SMF); Ib., 3 ♀♀, 13 Sep 1928; 1 ♂, 7 Jan 1929; 2 ♂♂, 2 Feb 1929 (Zwick). Argentina, Misiones, Arroyo Piray-Guazu, N of San Pedro, 1 ♀, 22 Nov 1973, O. S. Flint (NMNH).

Remarks.—The type has been described and the penial armature figured by Zwick (1972), who, in addition, identified as this species 8 males from Corupá. A reexamination of the material from this locality has shown that it comprises, besides a few more males, a considerable number of females. Here are presented figures of the head and pronotum (Fig. 39) of the holo-

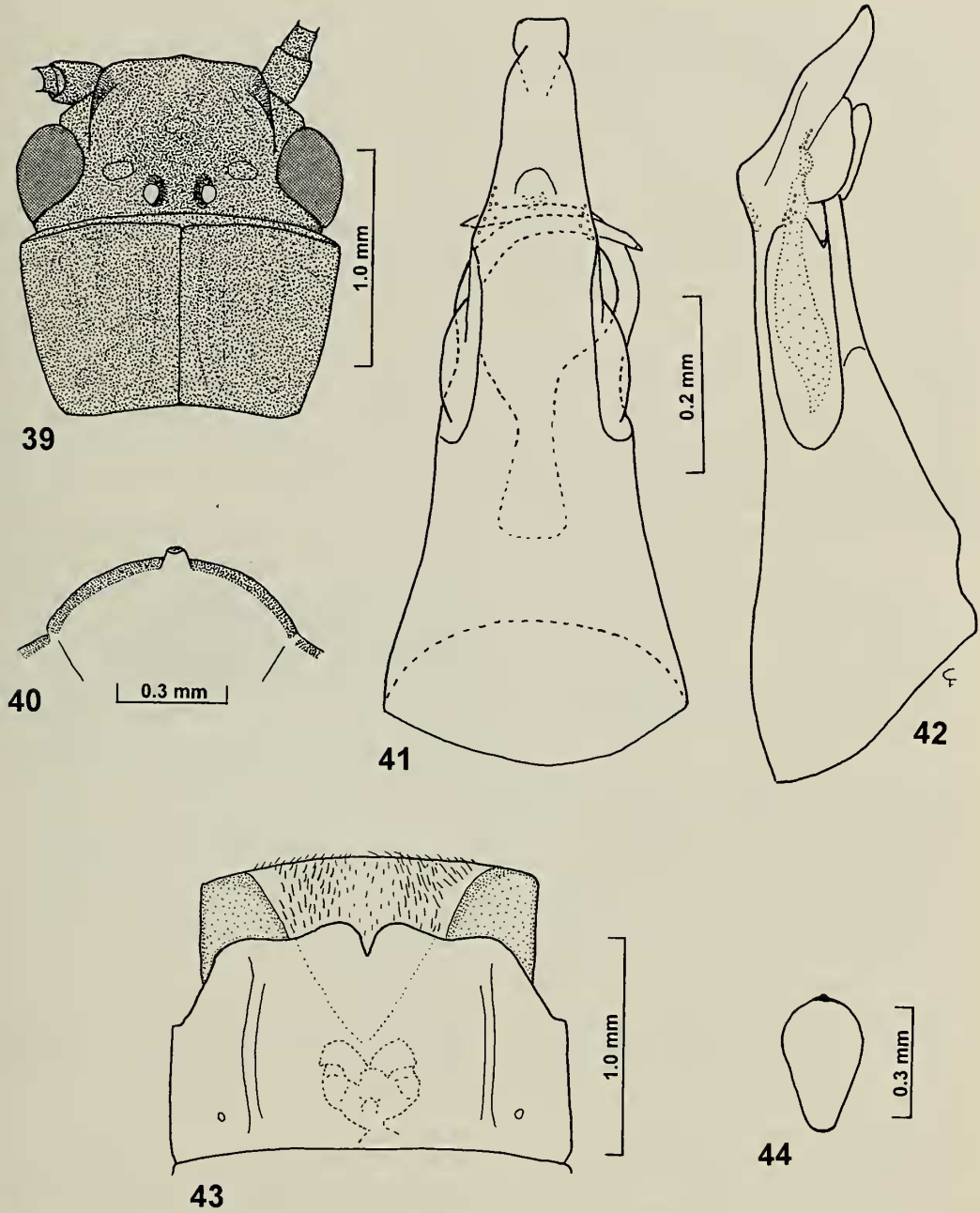


Figs. 32–38. *Anacroneuria plaumanni* Jewett: male allotype, 32, head and pronotum; 33, hammer; 34–35, penial armature, dorsal and lateral; 36, female holotype, sterna 8 and 9. *A. ampla*: female holotype, 37, sterna 8 and 9; 38, egg.

type, hammer (Fig. 40) and penial armature (Figs. 41–42) of the specimen from Rio dos Patos and female subgenital plate (Fig. 43) and egg (Fig. 44) from specimens from Corupá.

Anacroneuria subcostalis Klapálek
Figs. 45–46

Anacroneuria subcostalis Klapálek, 1921: 326.—Jewett, 1960: 174.



Figs. 39–44. *Anacroneuria polita* (Burmeister): 39, male holotype, head and pronotum; 40–42, male from Rio dos Patos; 40, hammer; 41–42, penial armature, dorsal and lateral; 43–44, female from Corupá; 43, sterna 8 and 9; 44, egg.

Material examined.—Brazil, Espírito Santo, 2 ♀♀ syntypes, ex coll. Fruhstorfer (NHMW). Additional material: Brazil, Rio de Janeiro, Nova Friburgo, Municipal Water Supply, 950 m, 1 ♀, 24 Apr 1973, O. S. Flint (NMNH).

Adult habitus.—The color pattern of this light-colored species with a lighter window

in the forewings is very distinctive and has been sufficiently described by Klapálek (1921) and Jewett (1960).

Male.—Unknown.

Female.—Forewing length, 13.7–14.2 mm. Subgenital plate (Fig. 45) 4-lobed, contour moderately wavy, with a certain variation among individuals. St9 with more sclerotized posterior border, almost straight or with median emargination; fields of stronger hairs dense.

Egg.—Oval, 0.36–0.38 by 0.20–0.21 mm (Fig. 46), posterior pole blunt.

Remarks.—This is a common species is southeastern Brazil; Jewett (1960) lists also 2 females from Amazonas State. In a future paper a list of localities and also a description of the male genitalia will be given.

Anacroneuria tinctilamella Jewett
Figs. 47–49

Anacroneuria tinctilamella Jewett, 1959: 154, figs. 7, 7A [head and pronotum, sterna 8 and 9].

Material examined.—Paratypes: Brazil, Santa Catarina, Nova Teutonia, 4 ♀♀, Nov 1955, F. Plaumann (NMNH); 7 ♀♀, Jan 1956 (Zwick). Additional material: Ib., 14 ♀♀, 8 Nov 1955 (NMNH); 1 ♀, Nov 1962, 1 ♀, Dec 1962 (CAS). Material uncertainly belonging to this species: Paraná, Rio dos Patos, 3 km E of Prudentópolis, 1 ♀, 2 Mar 1969, 1 ♀, 3 Mar 1969, W. L. & J. G. Peters (NMNH). Argentina, Misiones, Arroyo Coati, 15 km E of San José, 5 ♀♀, 18–19 Nov 1973, O. S. Flint, Jr. (NMNH); Arroyo Piray-Mini, W of Dos Hermanas, 5 ♀♀, 23 Nov 1973, O. S. Flint, Jr (NMNH).

Adult habitus.—General color light brown. Frons mostly brownish; commonly a transverse yellowish band including the M-line and a narrow lighter median stripe that extends to near ocelli; areas at sides of ocelli including part of the tentorial scars and at sides of eyes light. Lappets dark. Parietalia light. Antennae and palpi medium brown. Pronotum light brown with scattered small darker spots; a median yellowish stripe present. Legs uniformly light to medium brown. Wing membrane and veins light to medium brown; C and Sc paler. Cerci brownish from base.

Male.—Unknown.

Female.—Forewing length, 10.3–11.9 mm (n = 27, $\bar{X}$ = 10.87 mm). Subgenital plate (Fig. 47) brown, ventral tergal portion also brown, posterior margin 4-lobed, median notch usually deeper than lateral ones. "T" of St9 also brown, as the adjoining tergal portions. Lateral patches of larger hairs present but of moderate length.

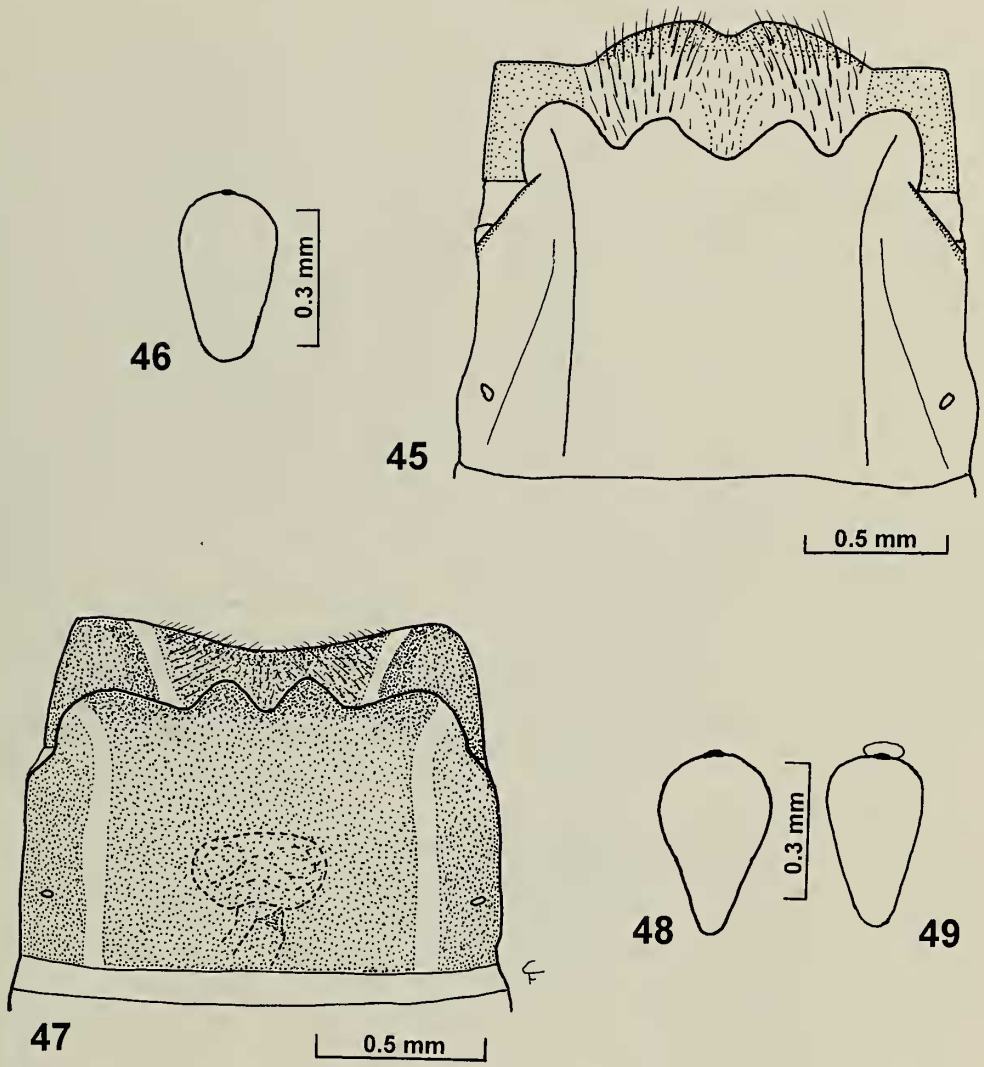
Egg.—Oval, with narrowed posterior pole, showing variation among those of different individuals, 0.21–0.24 by 0.37–0.40 mm (Figs. 48–49).

Remarks.—The brown subgenital plate and St9 are characteristic. The females listed as uncertainly belonging to this species agree as regards the subgenital plate and St9, but lack the transverse light band on the head, and specimens from Argentina have bicolored femora and cercal segments. Without associated males, it is not possible to make a reliable identification.

Anacroneuria trimacula Jewett
Figs. 50–54

Anacroneuria trimacula Jewett, 1959: 155, fig. 11 [head and pronotum].

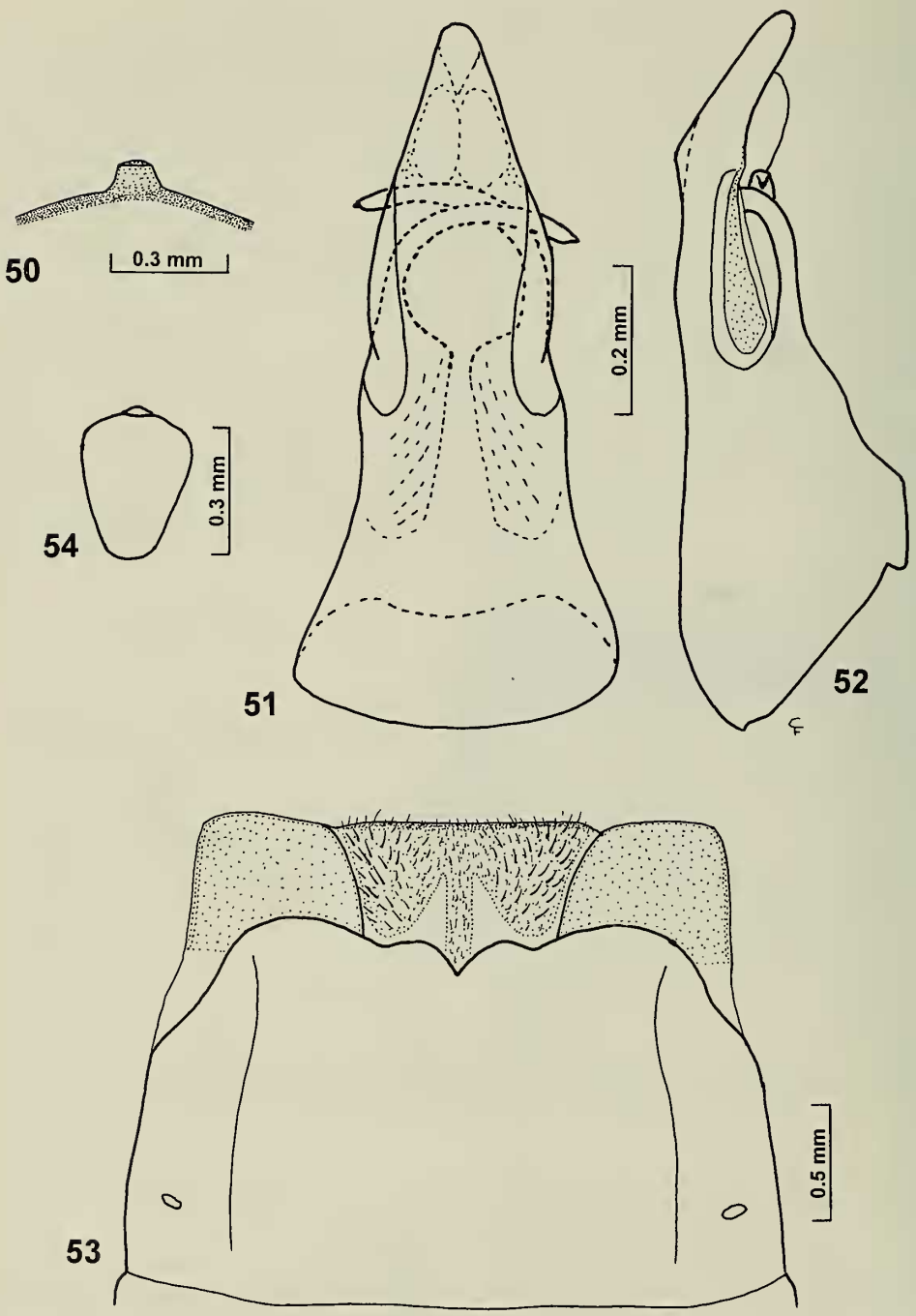
Material examined.—Paratype: Brazil, Santa Catarina, Nova Teutonia, 1 ♀, 11 Oct 1955, F. Plaumann (NMNH). Additional material: Ib., 1 ♀, Nov 1955 (Zwick); 1 ♂, Nov 1962 (CAS); 17 ♀♀, Jan 1975 (NMNH). Santa Catarina, Corupá, 29 ♂, W. Ehrhardt (SMF), as follows: 1 ♂, 12 Sep 1928; 1 ♂, 13 Sep 1928; 1 ♂, 4 Nov 1928; 3 ♂♂, 5 Nov 1928; 1 ♂, 14 Nov 1928; 1 ♂, 17 Nov 1928; 2 ♂♂, 25 Nov 1928; 3 ♂♂, 3 Dec 1928; 3 ♂♂, 7 Dec 1928; 1 ♂, 8 Dec 1928; 3 ♂♂, 9 Dec 1928; 1 ♂, 10 Dec 1928; 4 ♂♂, 6 Jan 1929; 1 ♂, 11 Feb 1929; 1 ♂, 16 Feb 1929; 1 ♂, 19 Feb 1929; 1 ♂, 7 Apr 1929. Ib., 3 ♂♂, 13 Sep 1928 (Zwick). Argentina, Misiones, Arroyo Co-



Figs. 45–49. *Anacroneuria subcostalis* Klapálek, female: 45, sterna 8 and 9; 46, egg. *A. tinctilamella* Jewett: female from Nova Teutonia, 47, sterna 8 and 9, 48, egg; 49, female from Misiones, egg.

ati, 15 km E of San José, 3 ♂♂, 3 ♀♀, 18–19 Nov 1973, O. S. Flint, Jr. (NMNH); Arroyo Liso, 8 km W of General Guemes, 7 ♀♀, 19 Nov 1973, O. S. Flint, Jr. (NMNH); Arroyo Saura, 9 km N of L.N. Alem, 1 ♀, 20 Nov 1973, O. S. Flint, Jr. (NMNH); Arroyo Piray Guazu, N of San Pedro, 1 ♀, 22 Nov 1973, O. S. Flint, Jr. (NMNH); Arroyo Piray Mini, W of Dos Hermanas, 2 ♂♂, 18 ♀♀, 23 Nov 1973, O. S. Flint, Jr. (NMNH). Paraguay, Paraguari, Parque Nacional Ybycui, 1 ♀, 23 Mar 1981, R. D. Cave (NMNH).

Adult habitus.—General color brown to dark brown. Frons with approximately triangular light area touching the mostly light M-line. A pair of light areas, including the tentorial scars, laterally to the ocelli; parietalia mostly light. Pronotum brown, median stripe yellowish to light brown. Femora brown with light bases more extensive from fore to hind femora, in these ca. half



Figs. 50–54. *Anacroneuria trimacula* Jewett: 50–52, male from Corupá, 50, hammer, 51–52, penial armature, dorsal and lateral; 53–54, female from Misiones; 53, sterna 8 and 9; 54, egg.

of femora light. Tibiae and tarsi brown. Wing membrane and veins brown, but C. Sc and R-R_1 may be paler. Cerci brown basally, then bicolored.

Male.—Forewing length, 10.6–12.2 mm. Hammer (Fig. 50) a truncate cone a little higher than half its base diameter. Penial armature (Figs. 51–52) tapering to apex; hooks with a regular curvature and pointed tips. Dorsal keel short, low. Pair of small subapical ventral vesicles present.

Female.—Forewing length, 14.0–17.1 mm. Subgenital plate (Fig. 53) four-lobed, lateral notches shallow, median one deeper. St9 with more or less straight posterior sclerotized band; median band long, with small setae, lateral patches with stron, dense setae.

Egg.—Ca. 0.25 by 0.36 mm, with broadly rounded posterior pole (Fig. 54).

Remarks.—The head color pattern readily separates this species. The penial armature bears some resemblance to that of *A. polita,* but this species is much smaller and has a different color pattern.

Anacroneuria cathia, new species
Figs. 55–60

Material examined.—Holotype, ♂ Brazil, Santa Catarina, Nova Teutonia, Nov 1962, F. Plaumann leg. (CAS). Paratypes: Ib., 1 ♀, 29 Oct 1948; 1 ♀, 23 Oct 1955; 1 ♀, Nov 1955; 1 ♂, 2 ♀♀, Nov 1956 (Zwick).

Adult habitus.—General color light-medium brown. Frons (Fig. 55) medium brown but lighter at clypeal area, laterally to ocelli and near eyes. M-line lighter but not conspicuous. Lappets darker posteriorly. Parietalia mostly light. Palpi light brown, antennae medium brown to brown. Pronotum (Fig. 55) medium brown with yellow to ochraceous median stripe. Wing membrane ochraceous-brown, veins light brown; C and Sc light brown basally and paler distally; R-R_1 pale basally, R_1 darker at and beyond anastomosis. Legs brown, bases of femora light, metafemora light for about half its length. Basal segments of cerci light, rest brownish, may be bicolored. The male type is lighter in colour, the posterior frons has a pair of large lighter areas and the wings are ochraceous. It seems to be teneral.

Male.—Forewing length, 11.1 mm (type) and 11.5 mm. Hammer (Fig. 56) a truncate cone lower than wide. Penial armature (Figs. 57–58), in dorsal/ventral views, slanting backwards gradually up to level of distal portions of hooks, then narrowing abruptly, apical portion subparallel. In side view, apex truncate. Ventrally, a pair of large vesicles. Hooks with regular curve, tips pointed. Dorsal keel low.

Female.—Forewing length, 12.5–15.2 mm. Subgenital plate (Fig. 59) four-lobed, median incision deeper than lateral ones. Vaginal sclerite as in Fig. 59. Posterior margin of St9 concave with thin sclerotized strips; lateral limits also more scerotized. Setal distribution as in *A. fuscicosta.*

Egg.—Elongate oval, ca. 0.36 by 0.20 mm, posterior pole simple (Fig. 60).

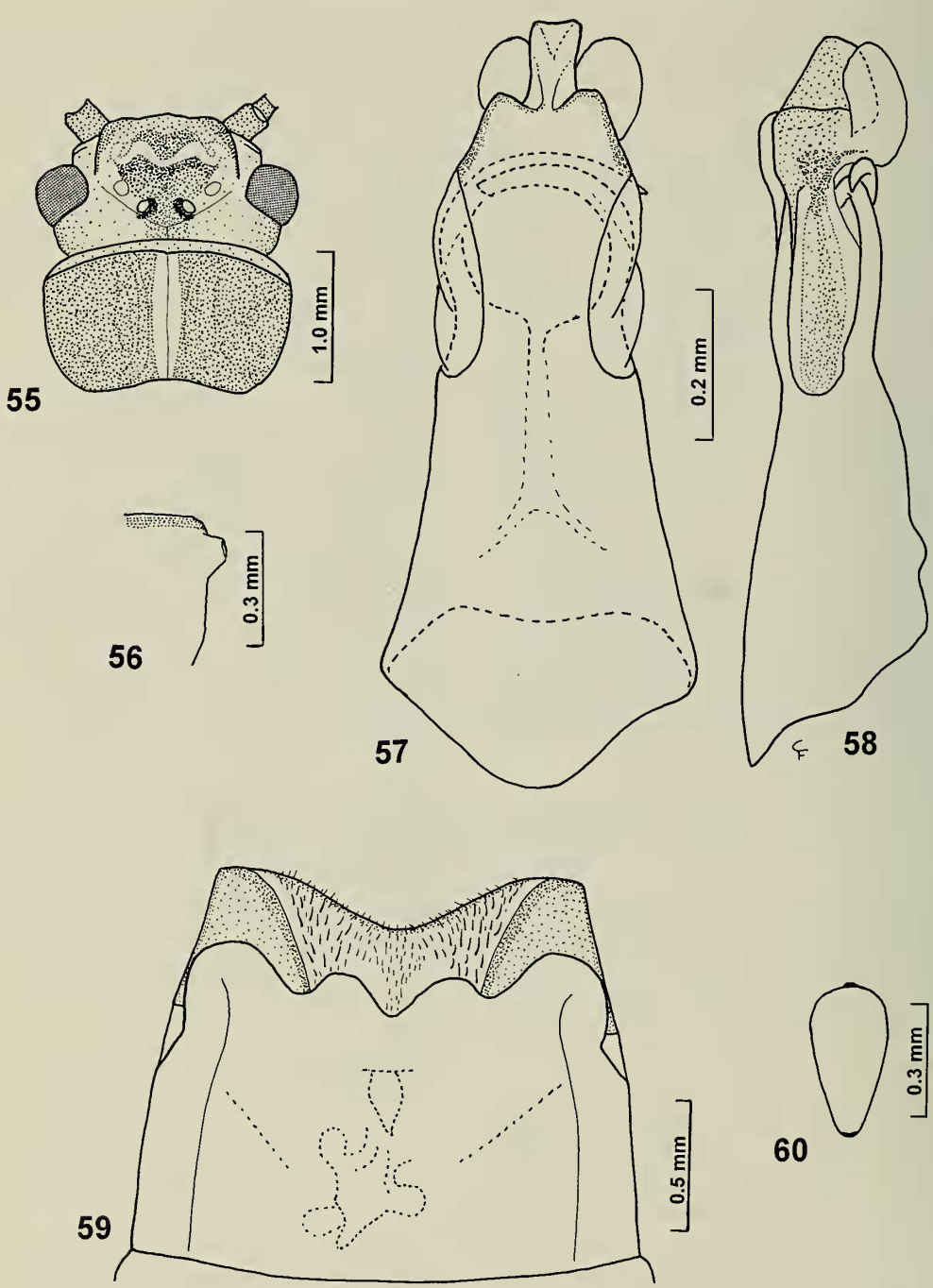
Remarks.—Externally similar to *A. fuscicosta* but the pronotum tends to have a well-defined yellowish median stripe. In the female, St9 is concave, as in *A. debilis.* The eggs, however, contrast with the plumper ones of *A. debilis,* and also, in relation to *A. fuscicosta,* in having a simple posterior end. The penial armature defines well the species.

Etymology.—From the name of the State of Santa Catarina.

Anacroneuria coscaroni, new species
Figs. 61–66

Material examined.—Holotype, ♂ Argentina, Entre Rios, Salto Grande, Rio Uruguay, 16 Nov 1973, O. S. Flint, Jr. (NMNH). Paratypes: Same data as holotype, 8 ♂♂, 6 ♀♀; same locality, 1 ♂, 1 ♀, 10 Feb 1973, S. Coscarón (NMNH).

Adult habitus.—General color brownish ochraceous to brown, females usually paler. Frons (Fig. 61) darker medially, often dark-



Figs. 55–60. *Anacroneuria cathia,* new species: 55, male paratype, head and pronotum; 56–58, male holotype; 56, hammer; 57–58, penial armature, dorsal and lateral; 59, female, sterna 8 and 9; 60, egg.

est in front of M-line; clypeal area, lappets and lateral parts light. From between the ocelli forwards, a narrow median lighter stripe. Parietalia light. Head pattern subdued in some specimens. Antennae and palpi brownish in males, yellowish in females. Pronotum (Fig. 61) brownish but median stripe and margins light brown to yellowish. Legs brownish in males, yellowish in females. Forewing membrane light brown to pale greyish, veins ochraceous to pale. Cerci light brown, sometimes darker distally.

Male.—Forewing length, 11.6–14.1 mm. Hammer (Fig. 62) in ventral view a short truncate cone ca. 0.1 mm in length; in side view, a short cylinder. Penial armature (Figs 63–64), in dorsal view, tapering from base to blunt apex; hooks regularly curved, tips pointed; dorsal keel low. In side view, portion distal to hooks sloping downwards; ventrally, a pair of small vesicles.

Female.—Forewing length, 14.1–18.4 mm. Subgenital plate (Fig. 65) 2-lobed. St9 relatively narrow, a "T" not marked off.

Egg.—Oval, 0.21–0.22 by 0.36 mm (Fig. 66).

Remarks.—This is a medium-large species. Some specimens are much darker, but in all the general color pattern and also male and female terminalia are concordant. The head pattern, when well-defined, is distinctive, recalling that of *A. impensa* by the light median frontal stripe, but their genitalia are different. In the male, the shape of the penial armature recalls that of *A. trimacula,* which is smaller and has a very different color pattern. In the female, the 2-lobed subgenital plate is similar to that of *A. dilaticollis,* which is smaller and has a different color pattern.

Etymology.—The name honors the Argentinian entomologist S. Coscarón.

Anacroneuria flintorum, new species
Figs. 67–70

Material examined.—Holotype, ♂ Brazil, Rio de Janeiro, Nova Friburgo, Municipal Water Supply, 950 m, 24 Apr 1977, C. M. & O. S. Flint, Jr. (NMNH).

Adult habitus.—General color brown. Frons brown but M-line, scars, parts of clypeal area and areas bordering eyes lighter (Fig. 67). Parietalia lighter brown except where adjoining dark frons; areas posterior to eyes also darker. Antennae brown, palpi medium brown. Pronotum (Fig. 67) dark, rugosities mostly a shade lighter. Legs brown, metafemora lighter basally. Wing membrane and veins brown but C and Sc lighter apically. Cerci brown basally, then bicolored.

Male.—Forewing length, 11.0 mm. Hammer (Fig. 68) a low cone. In dorsal view, penial armature (Figs. 69–70) tapering progressively to tip, this with an apical notch. Hooks cuving rather strongly, tips pointed. Dorsal keel transverse. In side view, from the keel the dorsal contour curves regularly to the tip. Ventrally, a pair of vesicles.

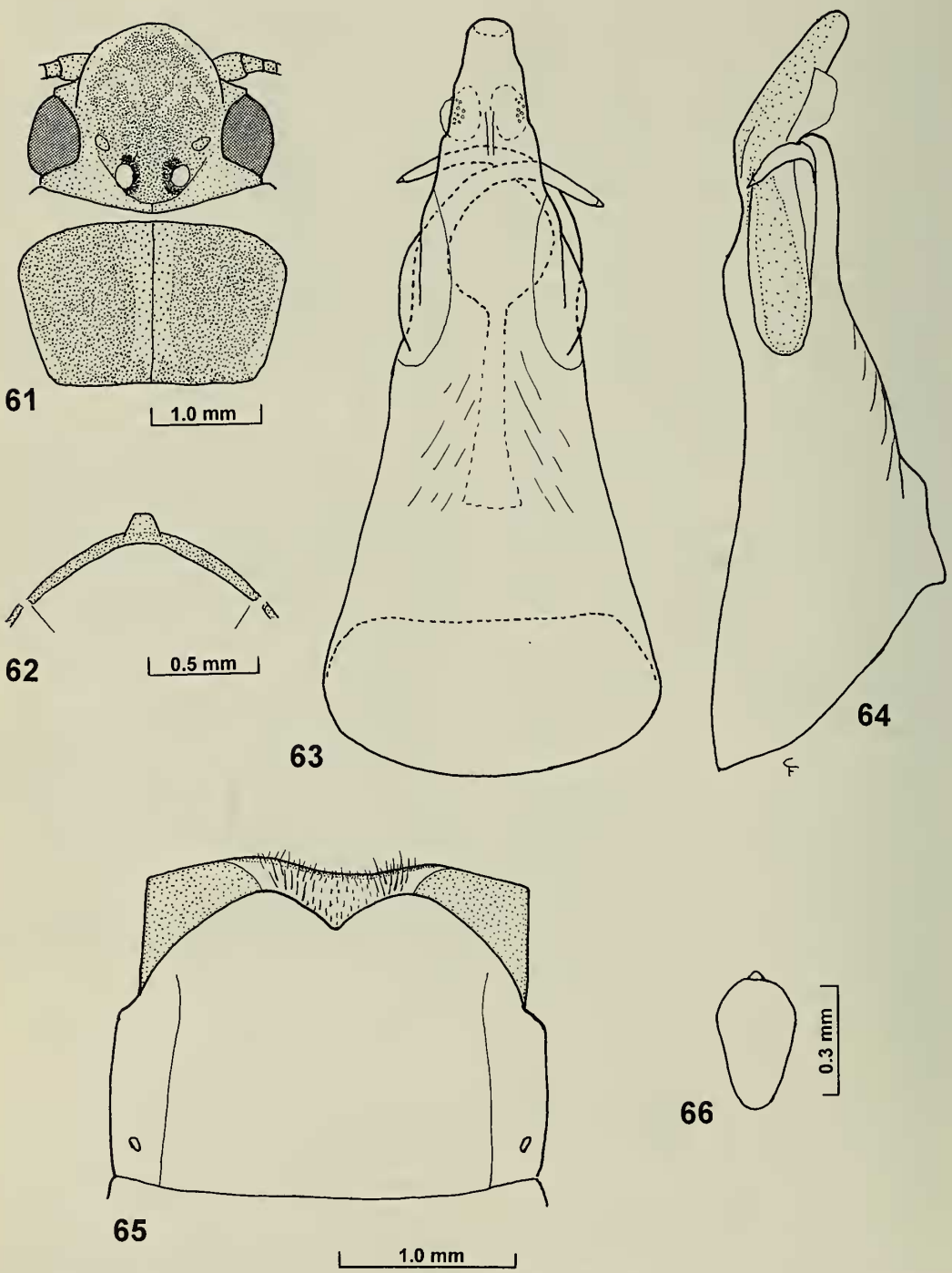
Female and egg.—Unknown.

Remarks.—The color pattern is not very distinct from that of the also dark *A. polita.* The penial armature recalls that of *A. polita* but the hooks are more strongly bent and instead of a low longitudinal keel, there is a transverse one.

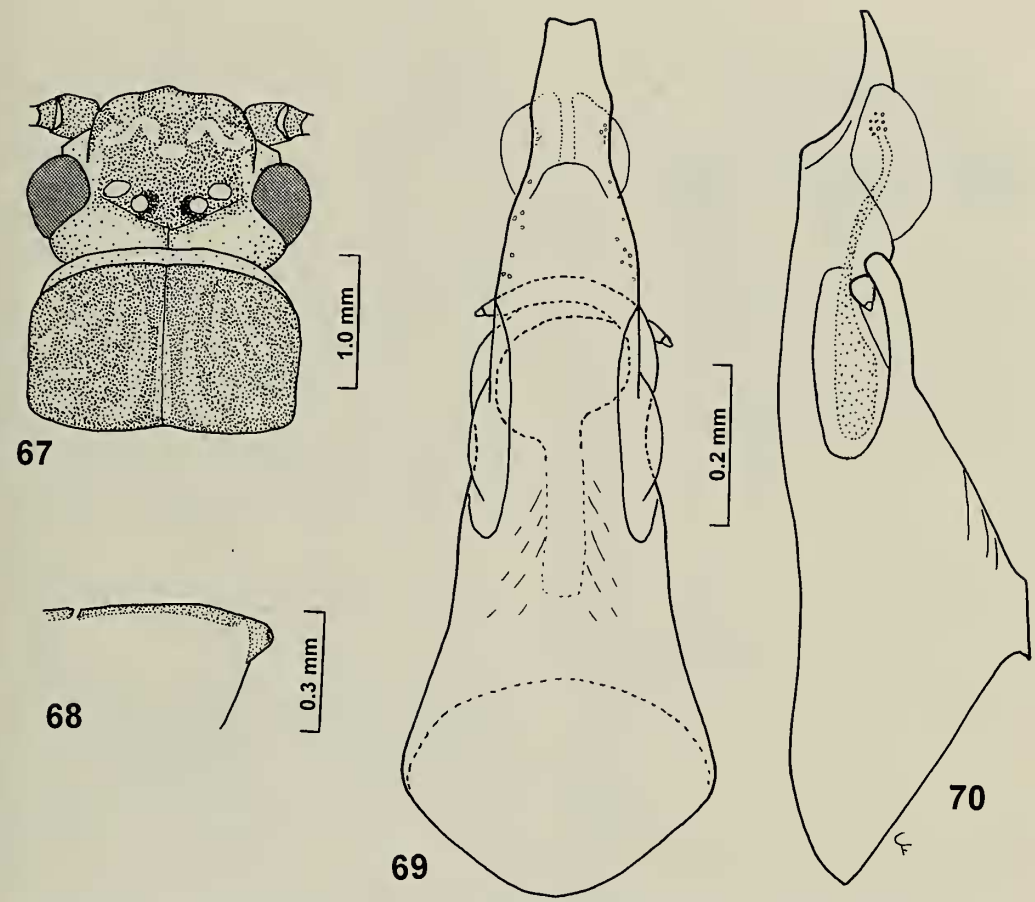
Etymology.—The name honors Oliver S. Flint, Jr. for his contribution to the knowledge of Brazilian caddisflies, and his wife Carol.

Anacroneuria stanjewetti, new species
Figs. 71–76

Material examined.—Holotype, ♂ Brazil, Santa Catarina, Nova Teutonia, F. Plaumann leg. (CAS). Paratypes: Ib., 1 ♂, 3 ♀♀, Jan 1956; 2 ♀♀, Oct 1960; 1 ♂, Nov 1962; 2 ♀♀, Dec 1962; 1 ♀, Nov 1963; 2 ♂♂, 2 ♀♀, Jan 1964 (CAS); 1 ♂, 1 ♀, Jan 1975 (NMNH). Argentina, Entre Rios, Salto Grande, Rio Uruguay, 1 ♂, 16 Nov 1973, O. S. Flint, Jr. (NMNH). Misiones, Arroyo Piray-Mini, W of Dos Hermanas, 2 ♂♂, 23 Nov 1973, O. S. Flint, Jr. (NMNH).



Figs. 61–66. *Anacroneuria coscaroni*, new species: 61–64, male; 61, head and pronotum; 62, hammer; 63–64, penial armature, dorsal and lateral; female, sterna 8 and 9; 66, egg.

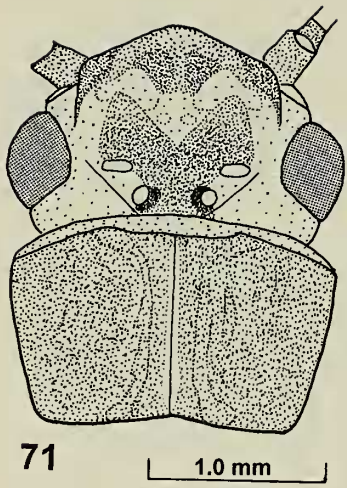


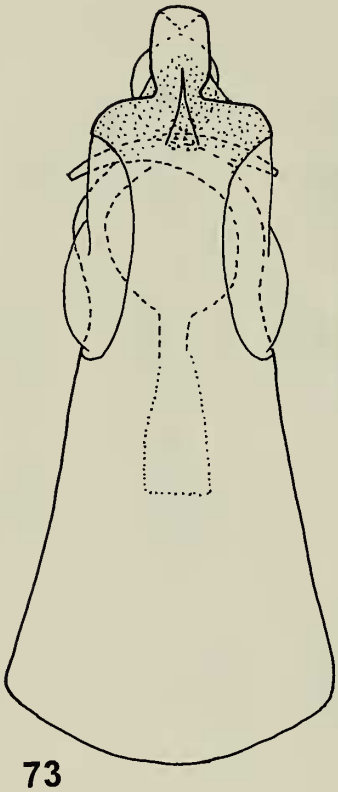
Figs 67–70. *Anacroneuria flintorum,* new species, male: 67, head and pronotum; 68, hammer; 69–70, penial armature, dorsal and lateral.

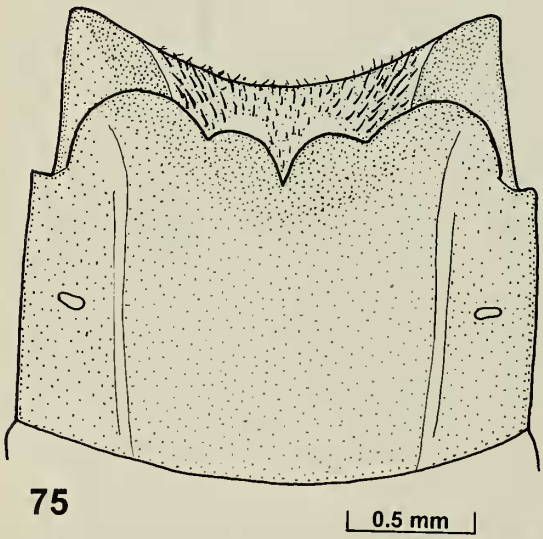
Adult habitus.—Head (Fig. 71) brown and ochraceous or yellowish. Posterior frons brown but lighter at M-line; lighter area often forming a wedge into the brown area, giving it a broad Y-shape. M-line light. Lappets brown, anterior frons brown but often with light markings. Parietalia light, often brownish behind eyes. Antennae brown; basal fourth of flagellum may be lighter. Palpi light brown. Pronotum (Fig. 71) brown, in several specimens with very thin light median stripe. Legs brown, metafemora half to two-thirds lighter basally. Wing membrane and veins brownish, C paler, Sc and R-R_1 darker in some specimens. Cerci brown, lighter basally, often bicolored distally.

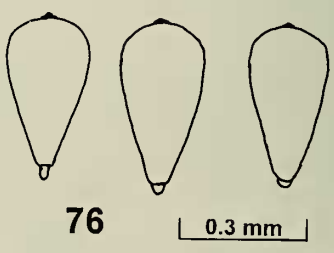
Male.—Forewing length, 8.0–9.5 mm. Hammer (Fig. 72) a short truncate cone, about as tall as half its basal width. Penial armature (Figs. 73–74) in dorsal/ventral view tapering gradually to near apex, then narrowing abruptly. Dorsal keel transverse. Hooks regularly curved, with blunt tips. In side view, from keel, a marked curvature that ends in pointed apex; ventrally, a large vesicle.

Female.—Forewing length, 12.3–13.5 mm. Subgenital plate (Fig. 75) four-lobed, median incision deeper than lateral ones, lateral lobes broader than median ones. Subgenital plate light brownish, posterior border darker. St9 broadly concave, setal distribution similar to that of *A. fuscicosta.*









Figs 71–76. *Anacroneuria stanjewetti,* new species: 71, female, head and pronotum; 71–74, male; 72, hammer; 73–74, penial armature, dorsal and lateral; 75, female, sterna 8 and 9; 76, egg.

Egg.—Elongate oval, about 0.42 by 0.19 mm (Fig. 76), posterior pole darkened, sometimes somewhat elongate, peg-like, but not forming a long peg as in *A. fuscicosta.*

Remarks.—This species is similar to *A. fuscicosta* but in specimens in which the head has a well-defined dark Y on the frons, the separation is not difficult. The male has a very different penial armature. The eggs, although with a darkened posterior pole, sometimes elongated, do not have the long peg of *A. fuscicosta.*

Etymology.—The name honors Stanley G. Jewett, Jr., who advanced the knowledge of Brazilian stoneflies.

Anacroneuria petersi, new species
Figs. 77–81

Material examined.—Holotype, ♂ Brazil, São Paulo, Santo André, Estação Biológica de Paranapiacaba, 15 Oct 1963, C. G. Froehlich (MZSP). Paratypes: Same data as holotype, 1 ♂. Paraná, Marumbi, Rio Marumbi, 490 m, 1 ♀, 15–16 Feb 1969, W. L. & J. G. Peters (NMNH).

Adult habitus.—Head (Fig. 77) with distinctive pattern. Frons with a broad band that tapers anteriorly and ends in an arc whose points almost touch the margin; M-line a shade paler; sides of frons yellowish. Parietalia brown and yellowish. Antennae and palpi yellowish. Pronotum (Fig. 77) brown with paler areas at lateral margins. Legs yellowish except for dark saddle at apex of femora. Wing membrane and veins pale yellowish. Cerci yellowish.

Male.—Forewing length of holotype, 9.0 mm, of paratype, 9.2 mm. Hammer (Fig. 78) a truncate cone a little shorter than basal diameter. Penial armature (Figs. 79–80) in dorsal view tapering from base to apex; hooks regularly curved with pointed tips. Dorsal keel low, in dorsal view appearing as 2 convex lines meeting distally. In side view, basal opening wide, narrowing strongly to mid portion; apical portion narrowing to a point; on ventral side, a pair of membranous vesicles.

Female.—Forewing length, 11.4 mm. Subgenital plate (Fig. 81) with 4 equal lobes. St9 with moderately strong bristles and a broadly concave posterior margin. Vaginal sclerite not seen.

Egg.—Unknown.

Remarks.—The color pattern is distinctive and uncommon, with a mostly brown head and thorax against pale appendages, including the wings. In the male, the penial armature has no special features and resembles that of *A. fuscicosta.* In the female, the terminalia also have no very distinctive features.

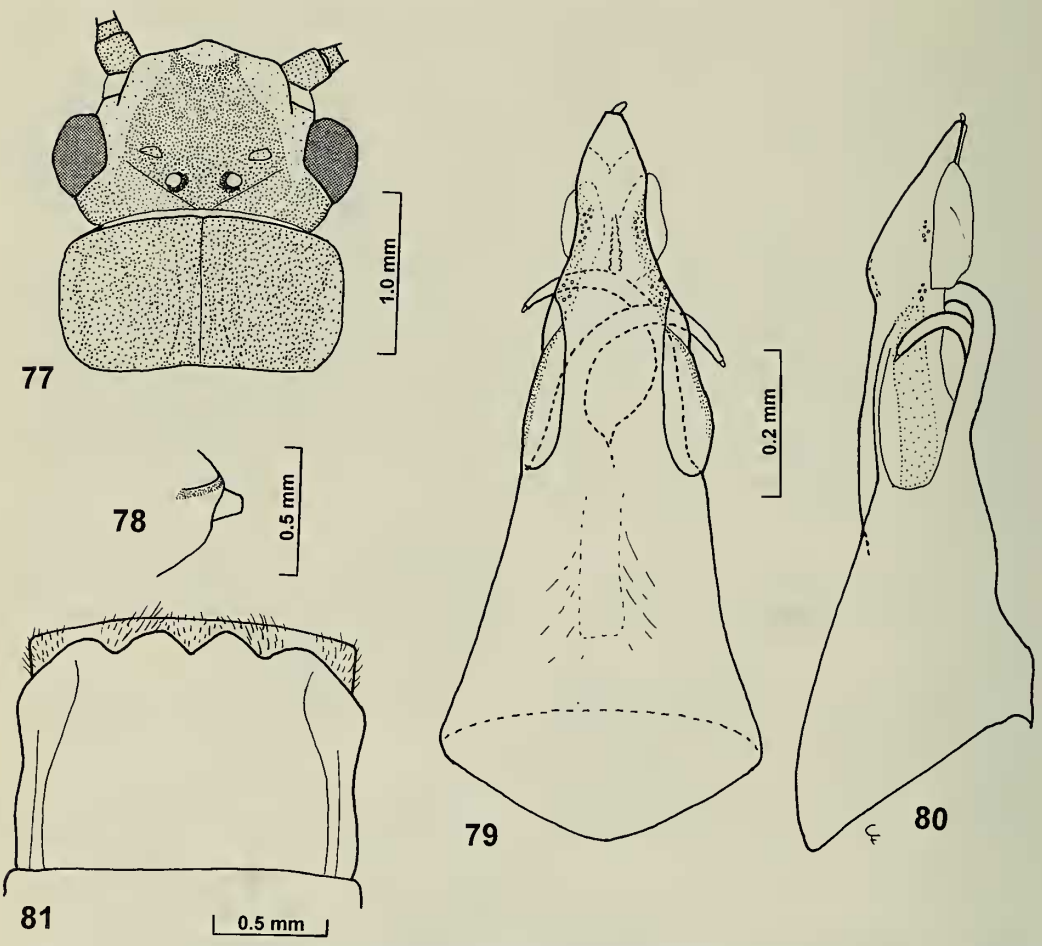
Etymology.—The name honors William L. Peters for his contribution to the knowledge of Brazilian mayflies, and who died untimely in February 2000.

Anacroneuria rondoniae, new species
Figs. 82–86

Material examined.—Holotype, ♂ Brazil, Rondônia, creek 8 km S of Cacaulândia, 21 Nov 1991, D. Petr (NMNH). Paratypes: Same data as holotype, 7 ♂♂, 5 ♀♀ (NMNH).

Adult habitus.—Head (Fig. 82) brown or light brown to pale brown. Central frons pale; anterior frons mostly light brown; posterior frons, parietalia and area contiguous to eyes light brown to pale, varying among specimens, pigment in part reticulate. Antennae and palpi whitish. Pronotum (Fig. 82) with pale median band, lateral parts brownish with paler areas. Legs unpigmented, whitish, except for knee cap of femora. Wings unpigmented, milky. Cerci with unpigmented cuticle but brownish hairs.

Male.—Forewing length 9.1–9.7 mm. Hammer (Fig. 83) cylindrical. Penial armature (Figs. 84–85) with pointed hooks; subapically, a pair of brownish projections; dorsal keel low, parenthesis-like in dorsal view; apex, in dorsal view, broad with



Figs. 77–81. *Anacroneuria petersi,* new species: 77–80, male holotype; 77, head and pronotum; 78, hammer; 79–80, penial armature, dorsal and lateral; 81, female from Rio Marumbi, sterna 8 and 9.

small median indentation, more pointed in side view. Ventral vesicles small.

Female.—Forewing length 12.2–13.2 mm. Subgenital plate (Fig. 86) brownish, 4 subequal distal lobes. St9 with relatively long bristles on lateral fields, distal margin almost straight. Laterotergites brownish. Vaginal sclerite as shown.

Egg.—Unknown.

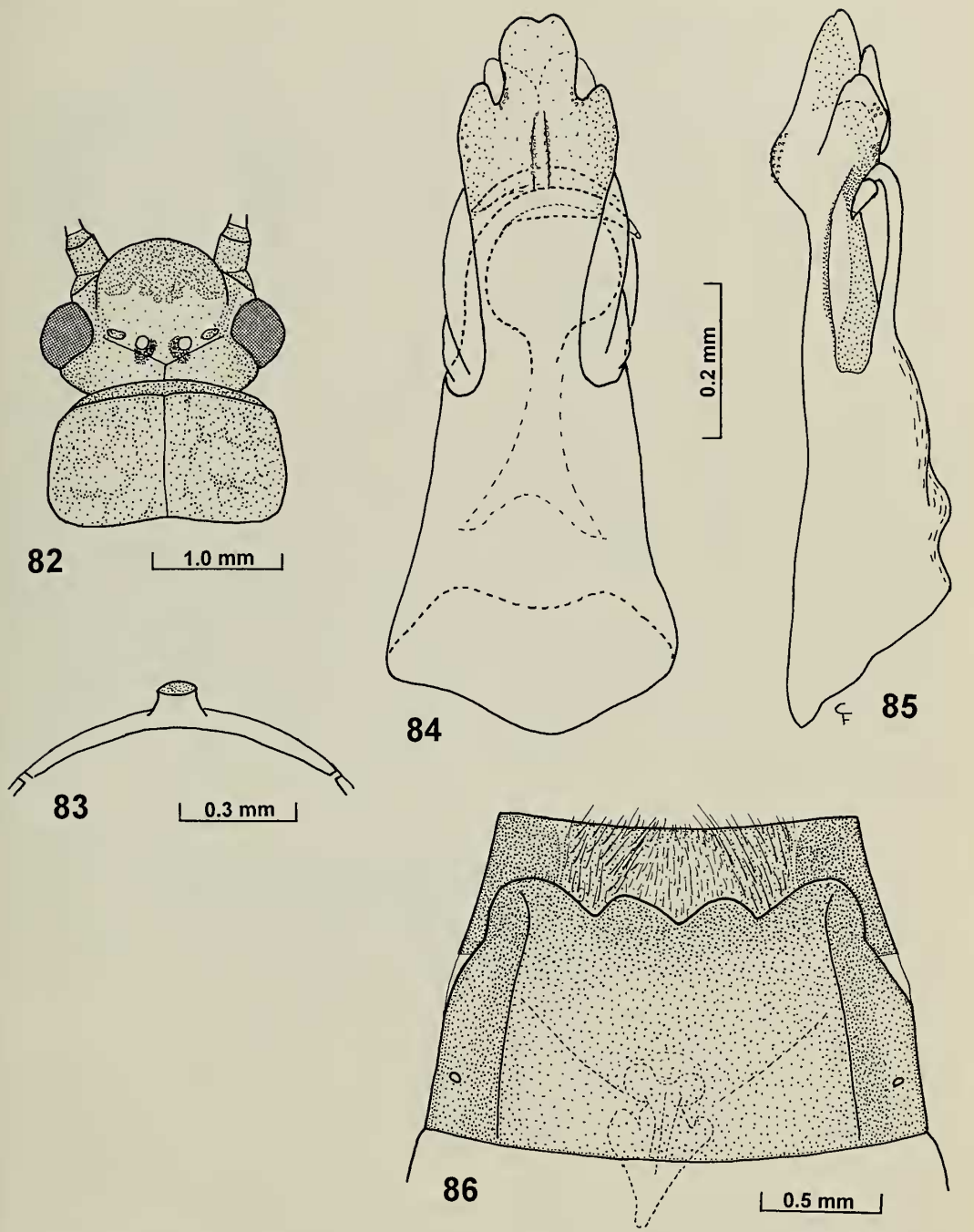
Remarks.—The color pattern, with the large pale areas on the head, the unpigmented antennae, palpi and legs, and the milky wings, is distinctive. So is the shape of the penial armature, with the lateral processes. In the female, the brownish subgenital plate is not common.

Etymology.—Belonging to Rondônia, the State in which it was collected.

Anacroneuria saltensis, new species
Figs. 87–92

Material examined.—Holotype, ♂ Argentina, Salta, Pena Baya, Cañada La Gotera, 16–17 Oct 1973, O. S. Flint (NMNH). Paratypes: Same data as holotype, ♂ (NMNH); La Viña, 5 ♀♀, 25 Nov 1983, L. E. Peña (NMNH).

Adult habitus.—Head (Fig. 87) mostly yellowish; from near to ocelli and scars light to pale brown; in front of M-line light brown. Parietalia yellowish. Antennae and



Figs. 82–86. *Anacroneuria rondoniae,* new species: 82–85, male; 82, head and pronotum; 83, hammer, 84–85, penial armature, dorsal and lateral; 86, female, sterna 8 and 9.

palpi brown in males, lighter in females. Pronotum (Fig. 87) yellowish, with pair of sublateral brownish bands. Legs yellowish to pale brown. Forewing membrane pale ochraceous, veins light brown, C pale, Sc brownish. Cerci pale to light brown.

Male.—Forewing length of holotype, 15.2 mm, of paratype, 15.5 mm. Hammer (Fig. 88) cylindrical, ca. 0.12 mm long. Penial armature (Figs. 89–90) with pointed hooks; dorsal keel a relatively high hump; sides of armature at level of keel brownish; apex rounded.

Female.—Forewing length 17.3–18.2 mm. Subgenital plate (Fig. 91) 4-lobed, median notch deep. St9 with T-shaped fields of hairs, lateral longer hairs moderately dense; some long hairs at margin. Margin broadly concave, with sclerotized stripe.

Egg.—Elongate oval, posterior pole broadly rounded (Fig. 92).

Remarks.—This is a medium-large, light-colored species. The penial armature with its high hump is distinctive. In the female, the deep median notch is not common.

Etymology.—In reference to the Salta Province of Argentina.

Anacroneuria caraja, new species
Figs. 93–96

Material examined.—Holotype, ♂ Brazil, Pará, Rio Xingu camp (52°22′W, 3°39′S), ca. 60 km S of Altamira, 1–21 Oct 1986, P. Spangler & O. S. Flint (NMNH).

Adult habitus.—General color whitish. Head and pronotum (Fig. 93) pale, pronotum with slightly darker patches. Palpi pale, antennae brown, flagellum in part ringed. Femora pale, indistinctly bicolored; tibiae and bases of tarsi light brown, apices of tarsi brown. Forewing membrane pale ochraceous, most veins light brown but C, Sc and R-R_1 pale, R_1 darker at and beyond anastomosis. Cerci pale.

Male.—Forewing length, 11.2 mm. Hammer (Fig. 94) a truncate cone ca. 0.14 mm long. Penial armature (Figs. 95–96) more sclerotized subapically, with a pair of conspicuous shoulders; a dorsal keel absent. Hooks regularly curved, with pointed tips.

Female and egg.—Unknown.

Remarks.—The combination of the pale color with the shoulders of the penial armature and lack of dorsal keel distinguishes this species.

Etymology.—The name of an indian tribe in central Brazil—a noun in apposition.

Anacroneuria toriba, new species
Figs. 97–100

Material examined.—Holotype, ♂ Brazil, São Paulo, Campos do Jordão, Dec 1945, J. Lane (NMNH).

Adult habitus.—General color brown. Head pattern (Fig. 97) similar to that of *A. debilis*: Frons dark brown, but M-line, scars, area lateral to ocelli and borders of eyes reddish-brown; clypeal area also lighter. Parietalia reddish brown. Palpi and antennae dark brown. Pronotum (Fig. 97) brown with lighter median stripe. Legs brown. Wing membrane and veins brown; C and Sc lighter distally. Cerci reddish brown basally, then brown.

Male.—Forewing length, 10.6 mm. Hammer (Fig. 98) almost cylindrical, about as long as wide. In dorsal/ventral views, penial armature (Figs. 99–100) subparallel, narrowing abruptly to end piece. Dorsal keel a hump in side view, a V opening distally in dorsal view. Hooks pointed. Distoventrally, a membranous vesicle.

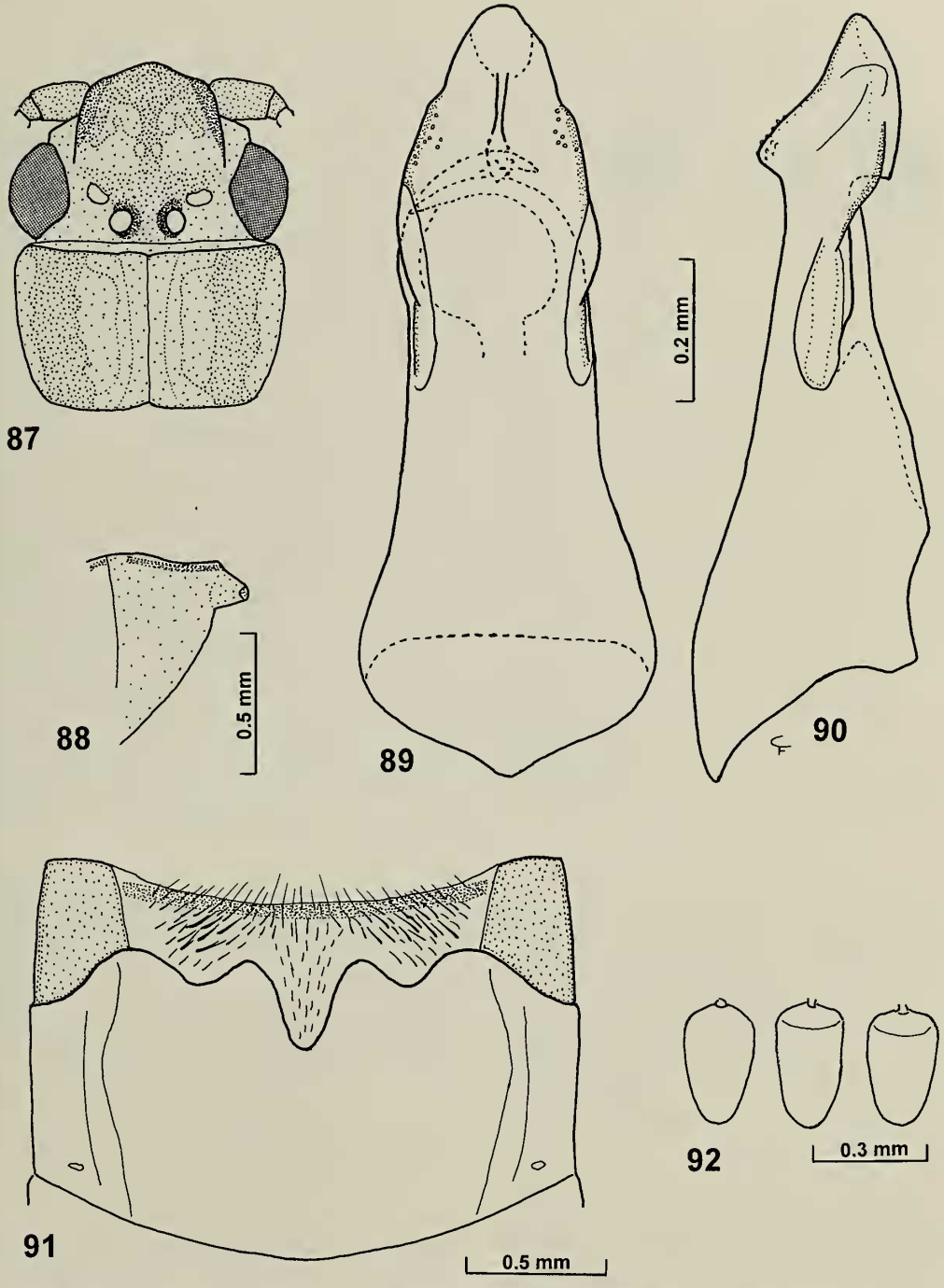
Female and egg.—Unknown.

Remarks.—The head pattern is similar to that of *A. debilis.* The penial armature recalls that of *A. stanjewetti,* but the subapical hump is different and the hooks are pointed.

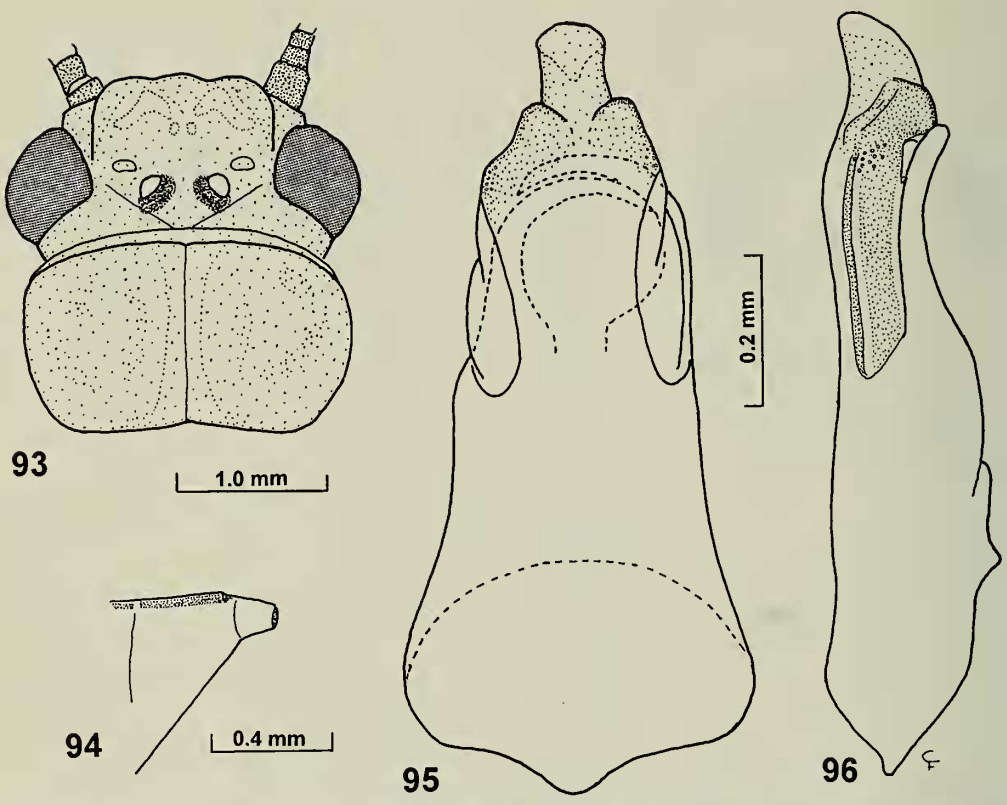
Etymology.—Toriba, from the Tupy language, meaning joy, feast, a noun in apposition.

Anacroneuria uyara, new species
Figs. 101–106

Material examined.—Holotype, ♂ Brazil, Santa Catarina, Nova Teutonia, Jan 1975, F. Plaumann (NMNH). Paratypes:



Figs. 87–92. *Anacroneuria saltensis,* new species: 87–90, male; 87, head and pronotum; 88, hammer; 89–90, penial armature, dorsal and lateral; 91, female, sterna 8 and 9; 92, three eggs.



Figs. 93–96. *Anacroneuria caraja,* new species, male: 93, head and pronotum; 94, hammer; 95–96, penial armature, dorsal and lateral.

Brazil, Santa Catarina, Nova Teutonia, 1 ♀ (as paratype of *A. ampla*), Oct 1956, F. Plaumann (Zwick); same data as holotype, 2 ♂♂, 26 ♀♀ (NMNH). Paraná, Rio dos Patos, 3 km E of Prudentópolis, 1 ♂, 2 Mar 1969, W. L. & J. G. Peters (NMNH). Argentina, Entre Rios, Salto Grande, Rio Uruguay, 1 ♂, 16 Nov 1973, O. S. Flint, Jr. (NMNH).

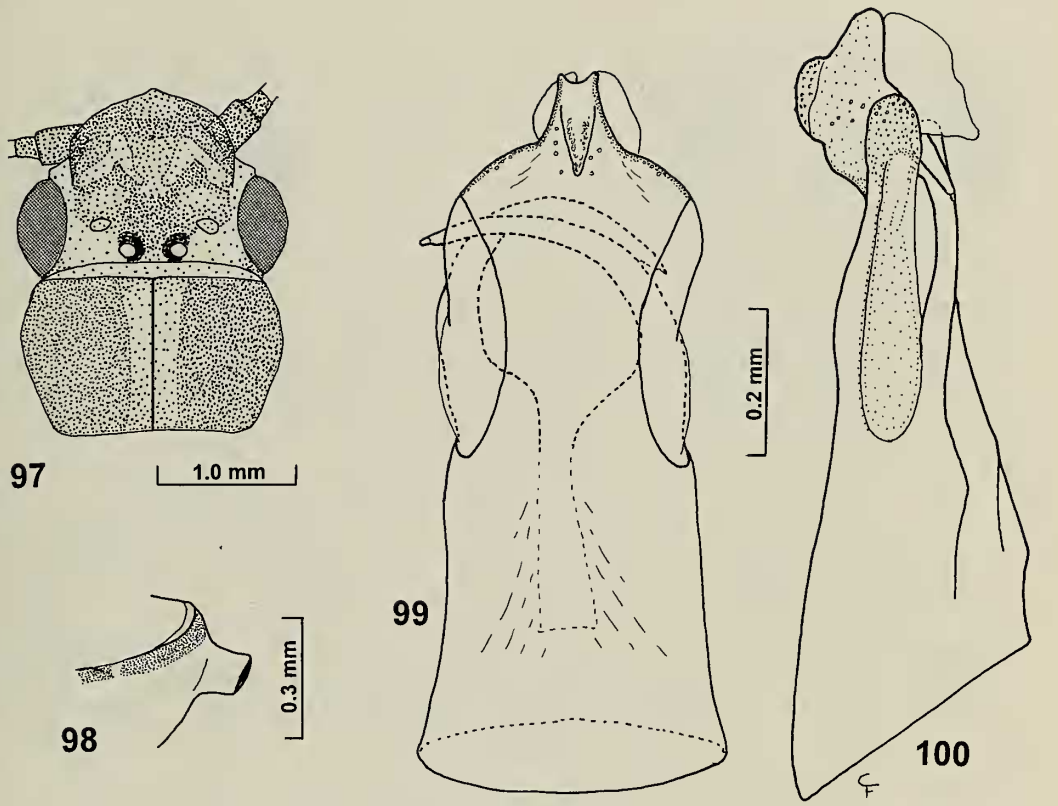
Adult habitus.—General color brown. Males darker than females. Frons (Fig. 101) mostly brown, part of clypeal area, M-line and tentorial scars lighter. Parietalia yellowish to light brown. Antennae brown, palpi lighter. Pronotum (Fig. 101) brown, median light stripe well-defined or not. Legs brown, femora may be lighter, especially basally. Wing membrane and veins light brown to brown, hyaline. C, Sc and R-R_1 lighter. Cerci brown, basal segments lighter, from ca. mid-length bicolored, but apical ones may be brown.

Male.—Forewing length 12.3–14.2 mm. Hammer (Fig. 102) a short truncate cone. Penial armature (Figs. 103–104) with evenly curved hooks, their tips pointed. In side view, dorsal keel forms a pre-apical hump; ventrally, a pair of membranous vesicles.

Female.—Forewing length, 16.8–19.7 mm. Subgenital plate (Fig. 105) 4-lobed, median notch deeper than lateral ones and bottom rounded or pointed. Posterior margin of St9 membranous, with hairs; lateral hair patches dense, hairs relatively short.

Egg.—Plump, ca. 0.28 by 0.36 mm (Fig. 106).

Remarks.—In color pattern and size this species is similar to *A. plaumanni.* They



Figs. 97–100. *Anacroneuria toriba,* new species, male: 97, head and pronotum; 98, hammer; 99–100, penial armature, dorsal and lateral.

may be readily distinguished by the penial armature and eggs. The penial armature of *A. uyara* recalls that of *A. debilis,* a sympatric but much smaller species. The plump eggs are also similar to those of *A. debilis.*

Etymology.—Uyara, a water nymph of Tupy lore, a noun in apposition.

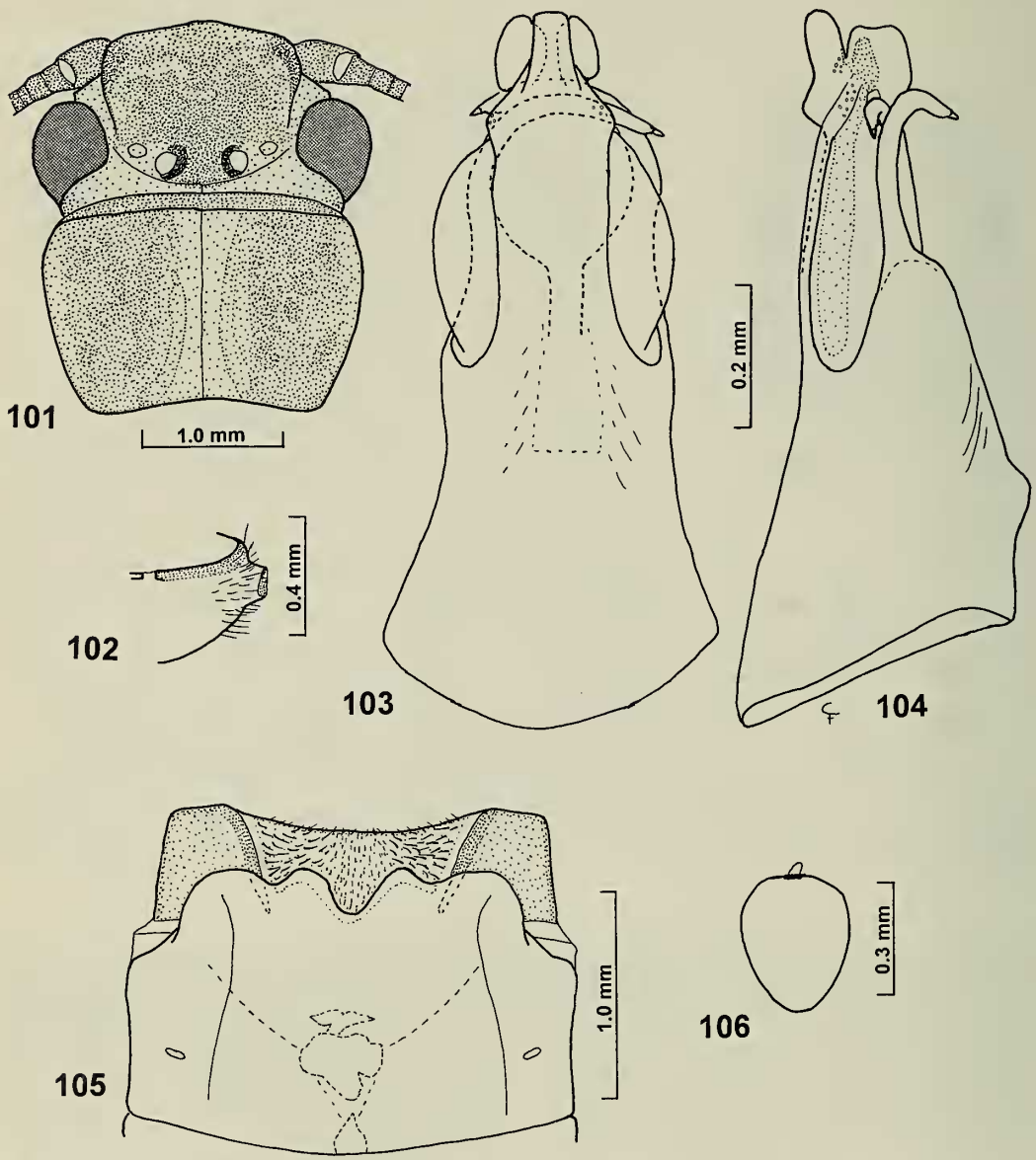
Anacroneuria xinguensis, new species
Figs. 107–112

Material examined.—Holotype, ♂ Brazil, Pará, Rio Xingu camp (52°22′W, 3°39′S), ca. 60 km S of Altamira, 1–21 Oct 1986, P. Spangler & O. S. Flint (NMNH). Paratypes: Same data as holotype, 2 ♂♂, 2 ♀♀; same, but 14 Oct 1986, 2 ♀♀.

Adult habitus.—General color very pale brown to whitish. Head (Fig. 107) pale; flagellum of antennae with bicolored segments pale and light brown; palpi light to medium brown. Pronotum (Fig. 107) with sublateral pale brown stripes. Femora yellowish, tibiae and tarsi more yellowish. Wings clear, veins pale brown but C, Sc and R-R_1 unpigmented. Basal cercomeres unpigmented, rest yellowish.

Male.—Forewing length, 8.8–9.5 mm. Hammer (Fig. 108) a truncate cone about as high as basal diameter. In dorsal view, penial armature (Figs. 109–110) tapering more strongly in basal fourth, then more gradually to rounded apex. Hooks regularly curved, tips pointed. Dorsal keel low, with spinules. In side view, apical tip blunt; on ventral side, a pair of vesicles.

Female.—Forewing length, 10.4–11.2 mm. Subgenital plate (Fig. 111) with median notch only; vaginal sclerite as shown.

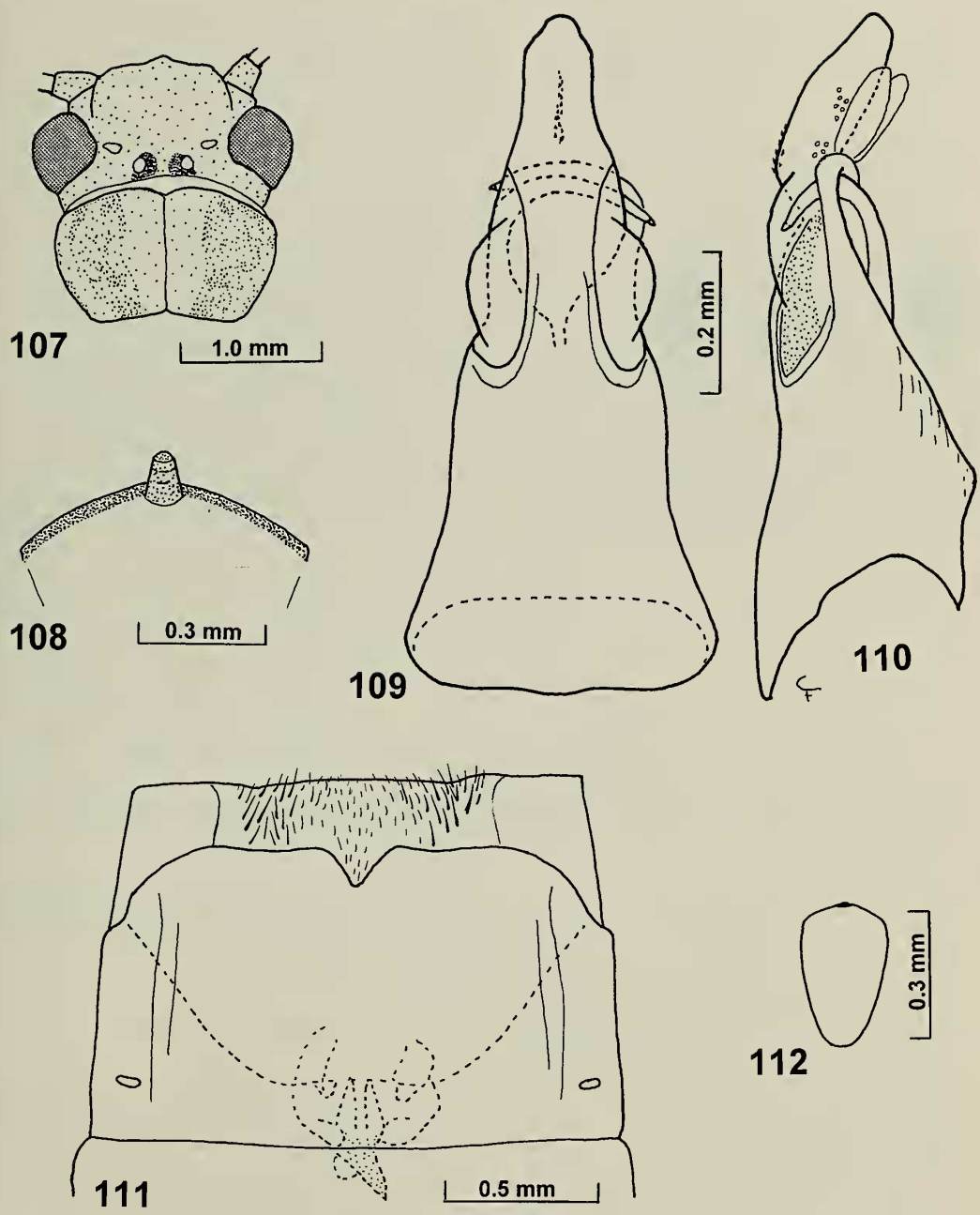


Figs. 101–106. *Anacroneuria uyara,* new species: 101–104, male holotype; 101, head and pronotum; 102, hammer; 103–104, penial armature, dorsal and lateral; 105, female, sterna 8 and 9; 106, egg.

St9 with pair of patches with moderately long hairs.

Egg.—Oval, ca. 0.21 by 0.35 mm (Fig. 112).

Remarks.—This species is similar to *Anacroneuria genualis* (Navás) 1932 from São Martinho, Rondônia, on the banks of the Guaporé River. *A. genualis,* however, is more yellowish and the pronotum lacks the sublateral stripes. The forewing is 11.7 mm long. These are small differences, but as the single specimen of the latter has lost the abdomen, a decision is impracticable. In the male, the penial armature recalls that of *A. trimacula* Jewett, but the color pattern is totally different. In the female, the subgen-



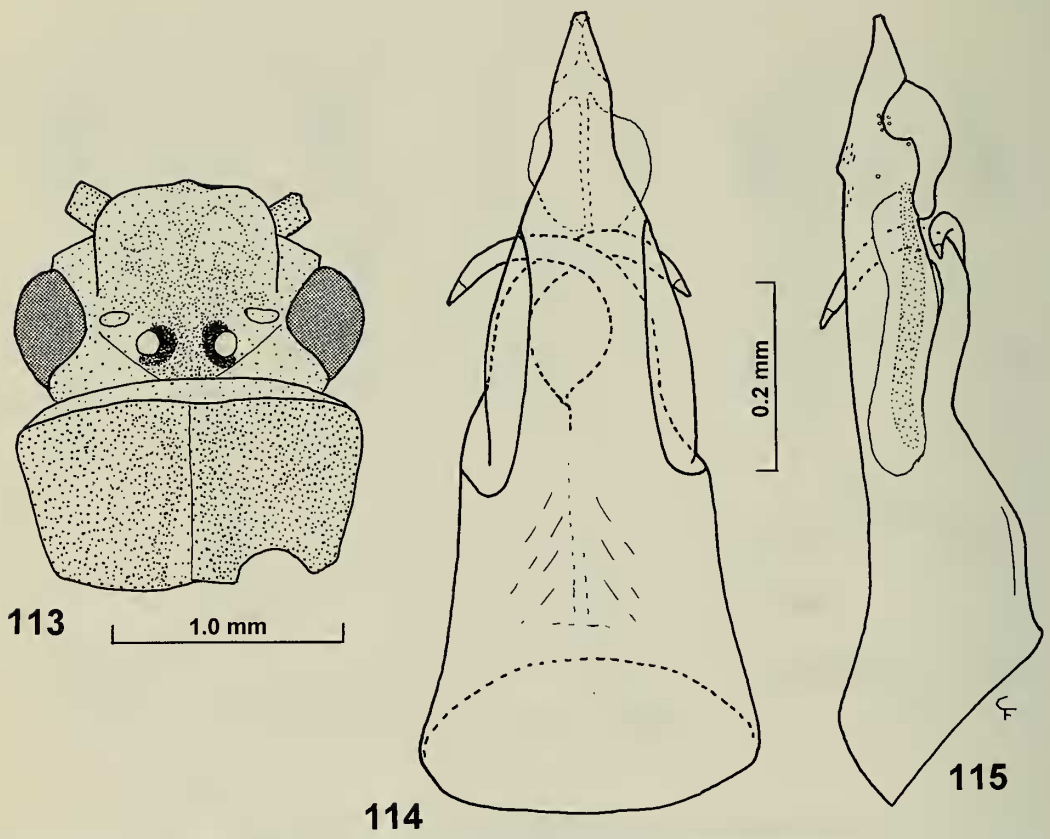
Figs. 107–112. *Anacroneuria xinguensis,* new species: 107–110, male; 107, head and pronotum; 108, hammer; 109–110, penial armature, dorsal and lateral; 111, female, sterna 8 and 9; 112, egg.

ital plate with only a median incision is uncommon and recalls that of the dark *A. polita* (Burmeister).

Etymology.—The name is derived from the Xingu River.

Anacroneuria ytuguazu, new species
Figs. 113–115

Material examined.—Holotype ♂ Argentina, Entre Rios, Salto Grande, Rio Uru-



Figs. 113–115. *Anacroneuria ytuguazu,* new species, male: 113, head and pronotum; 114–115, penial armature, dorsal and lateral.

guay, 16 Nov 1973, O. S. Flint, Jr. (NMNH).

Adult habitus.—General color yellowish. Head (Fig. 113) pale brown at central frons and between ocelli, rest yellowish. Palpi and bases of antennae (rest lost) yellowish. Pronotum pale brown to yellowish. Legs, wings and cerci yellowish.

Male.—Forewing length, 9.1 mm. Hammer damaged. Penial armature (Figs. 114–115), in dorsal view, tapering gradually forward to end in truncate tip but with a small constriction near the distal portion; in side view, a very low keel. Hooks regularly curved with pointed tips. On ventral side, at level of constriction, a pair of vesicles.

Female and egg.—Unknown.

Remarks.—This small-sized light-colored species is distinguished by the male genitalia, with its very low keel.

Etymology.—The name is a free rendering of Salto Grande into Tupy, and is a noun in apposition.

Acknowledgments

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